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CAMPS AND CRUISES OF AN ORNITHOLOGIST

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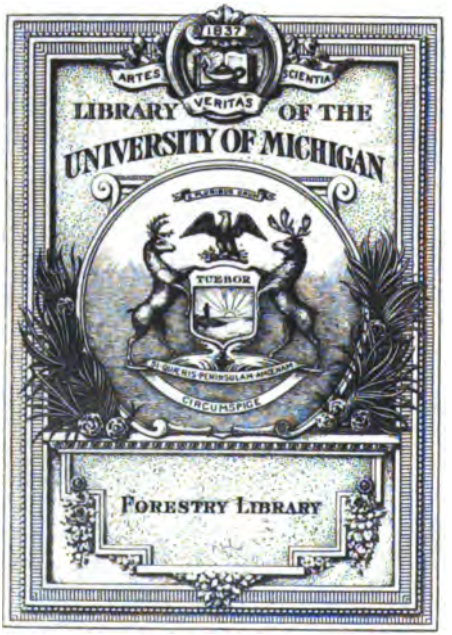
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OF AN

ORNITHOLOGIST

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Curator of Birds in the American Museum of Natural History.

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BY

FRANK M. CHAPMAN

CURATOR OF ORNITHOLOGY, AMERICAN MUSEUM OF NATURAL HISTORY
FELLOW OF THE AMERICAN ORNITHOLOGISTS' UNION; AUTHOR OF
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"BIRD-LIFE;" "BIRD STUDIES WITH A
CAMERA," ETC.

WITH 250 PHOTOGRAPHS FROM NATURE BY THE AUTHOR

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I DEDICATE THIS VOLUME TO

HERMON C. BUMPUS

DIRECTOR OF THE AMERICAN MUSEUM OF NATURAL HISTORY

IN RECOGNITION OF HIS INVALUABLE AID AND ADVICE

AND TO THOSE

MEMBERS OF THE MUSEUM

WHOSE CO-OPERATION HAS MADE POSSIBLE THE

WORK ON WHICH IT IS BASED

Map Indicating Localities Visited

PREFACE

During the past seven years, with the assistance of artist and preparateur, I have devoted the nesting season of birds to collecting specimens and making field studies and photographs on which to base a series of what have been termed " Habitat Groups " of North American birds for the American Museum of Natural History.

These groups are designed to illustrate not only the habits and haunts of the birds shown, but also the country in which they live. The birds and, in most instances, their nests and young, are therefore placed in a facsimile reproduction, containing from sixty to one hundred and sixty square feet of the locality in which they are found, and to this realistic representation of their habitat is added a background, painted from nature, and so deftly joined to the foreground, that it is difficult to distinguish where one ends and the other begins. (See the photographs of groups on pages, 62, 111, 233, 243, 291.)

In selecting the subjects for these groups, not alone birds, but the country they inhabit has been taken into consideration; it being desired to have the series of great panoramic backgrounds, some of which are twenty-eight feet in length, portray not only the haunts of certain American birds, but America as well. Characteristic shore, marsh, prairie, plain, desert, forest, and mountain scenes present the major features of American physiography, and each is executed with an accuracy which gives to the groups a geographical as well as an ornithological value.

Some subjects were in nearby localities, which were easily visited; others were in remote places which were reached with more or less difficulty. In some cases an entire season was given to gathering the material for a single group—that of the Flamingos, for example; in others, several groups were secured in a single season, the Bahaman Man-o'-

War Birds, for instance, being obtained in April, the Carolina Egrets in May, the Saskatchewan Geese in June, and the Alberta Ptarmigan in July, 1907.

No ornithologist, I imagine, has ever pursued his calling with greater pleasure and satisfaction than I have experienced in gathering the material and data for these groups of birds. Not only has it been my fortune to behold some of the most interesting and remarkable sights in the world of birds, but it has been my privilege to have them reproduced in so admirable a manner that they convey to others a wholly adequate conception of the scene itself.

I desire now further to perpetuate these experiences and studies by telling the story of the various expeditions of which the groups were the objects, adding such information concerning the birds observed as seems worthy of record, and illustrating the whole with many photographs from nature and a number of the groups themselves.

It is a pleasure to acknowledge here my indebtedness to the co-laborers who have been associated with me in this seven years' task; to Mrs. Chapman, always my first field assistant, to Hermon C. Bumpus, whose suggestions and advice have been invaluable, to Louis Agassiz Fuertes, artist and tried camp-mate, to Carlos Hittell, Bruce Horsfall and Hobart Nichols, artists, to J. D. Figgins, preparateur, to H. C. Denslow, Herbert Lang, and E. W. Smith, taxidermists. Without the coöperation of these efficient fellow workers the undertaking in which this book has its origin, could not have been brought to a successful conclusion.

Several of the following chapters have appeared in "The Century," "Scribner's," "Country Life in America," "Outing," and "Bird-Lore," but the greater number have not before been published.

FRANK M. CHAPMAN.

American Museum of Natural History.

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INTRODUCTION

I earnestly hope that the photographs in this volume will so effectively illustrate the part the camera may play in definitely recording facts in bird-life, that they will stimulate fresh interest in the subject of bird photography. To further this end I add here a word to what I have said on the outfit of the bird photographer in "Bird Studies with a Camera".

So far as cameras and lens are concerned, I have found no reason to change the advice offered in that volume. I still use a reflecting camera of the "Graflex" type, and also a tripod camera, each with a bellows length of fifteen inches, and carrying plates four by five inches.

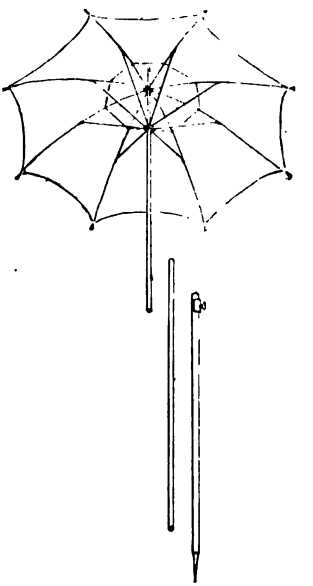
With about twenty exceptions all the pictures in this book were made with the lens described in " Bird Studies with a Camera". It is a Bausch & Lomb Convertible Series VIIa No. 10, F. 6. 3., with a focal length of eight inches, the component lenses having each a focal length of fourteen inches. Although these single lenses are rated with a speed of only F. 12. 5., I have found no difficulty in making satisfactory pictures of birds in flight with an exposure of one-thousandth of a second, the lens being wide open.

The single lens will not, of course, do the work of the doublet and, if one can afford a No. 19 lens of the same series with a focal length of thirteen and one-eighth inches, the components being each of twenty-three and one-eighth inch focus, he will materially increase his chances of success; but were I to be restricted to one lens and one camera, I should take the lens first mentioned, and a camera of the reflecting type. Seventy-five per cent. of the pictures in this book were made with an outfit of this kind.

Of far more importance than the kind of camera or lens is the question of a blind which will enable one, *unseen,* to get and *stay* within range of one's subject. I frankly confess that when writing "Bird Studies with a Camera", I did not appreciate the importance of this matter. If one would study the habits of wild creatures under natural conditions, it is absolutely essential that they be unalarmed by your presence. The observer who is content with mental impressions and note-book descriptions, may often find cover whence, with the aid of field-glasses, he can see to advantage without the object of his study being aware of his proximity. But he who besides written descriptions would also record his observations in that more graphic, communicable form of which photography admits, must be much nearer his subject and must have cover from the shelter of which he may manipulate his camera without being detected. In short, he must have an artificial blind. It is the first requisite of such a blind that it be easily transportable; it should also be inconspicuous and so simple in construction that it may be quickly erected. The result of my first attempt (1900) to make a structure which would fill all these requirements, is shown on page 7, in the study of the Blue Jays. It was a ridiculously complicated affair of upright sticks and iron hoops, around which was placed a canvas painted in the somewhat distant semblance of bark. Ths affair was supposed to be an imitation tree trunk, and illustrates how far one may be carried on the wrong road by a false premise. The fundamental error in this case was the belief that the blind must be like some object in nature. As a matter of fact, this is not necessary. It should be as inconspicuous as possible and it is often more quickly accepted if it be partly disguised with bushes or vines. But its chief virtue is its immovability. It may excite suspicion for a time, but its inanimateness finally wins and, to the birds, it becomes a part of the landscape to be perched on if convenient.

This at least has been my experience with the blind from the shelter of which more than one-half the pictures in this volume were made. In brief, this blind is an umbrella opened within a bag long enough to fall to the ground. Its parts may be described in detail as follows:

The Umbrella.—The umbrella employed in making an observation blind is known to the trade as a "sign" umbrella. It agrees with the normal variety in size but differs from it in having a large hole in the centre. This permits a current of air to pass through the blind—a matter of the first importance when one spends hours in the little structure on beach or marsh, where it is fully exposed to the sun. The "stick" of this umbrella is a metal tube without the usual wooden handle.



The Umbrella and Supporting Rods

The Supporting Rod.—The umbrella is supported by two brass tubes each of the same length as the umbrella, or thirty-two inches. The larger is shod with a steel point, by the insertion of a small cold chisel or nail-punch, which is brazed in position. The rod can then be readily driven into the ground. At the upper end a thumb-screw is placed. The smaller tube should enter the larger snugly and should, in turn, be just large enough to receive the umbrella-rod, which will enter it as far as the spring "catch." The height of the umbrella may, therefore, be governed by the play of the smaller tube in the larger, while the thumb-screw will permit one to maintain any desired adjustment; as one would fix the height of a music rack.

The Covering.—If the blind is to be used about home, a

light denim may be employed; if it is to see the harder service of travel and camp-life, a heavier grade of the same material will be found more serviceable. In the former case the denim may be sewed to the edge of the umbrella, which then has only to be opened and placed in the brass tube, the latter having been thrust into the ground, when the blind is erected; an operation requiring less than a minute.

When travelling, it seems more desirable not to attach the walls of the blind to the umbrella. The covering then consists of several strips of material sewed together to make a piece measuring ten and a half feet wide by six and a half feet high. The two ends of this piece are sewed together at what then becomes the top of the blind, for about two feet. The unjoined portion below, becomes the door of the blind. Openings should be cut in the opposite side for the lens and for observation. A strong draw cord is then run about the top edge of the cloth so that, before inserting and opening the umbrella, one can draw it up as one would the neck of a bag, until the opening corresponds in size to that of the umbrella. The draw cord should be long enough to serve as a guy or stay. This covering places less strain on the umbrella and may be packed in smaller space than one which is sewed to the umbrella, and, when in camp, it may be used to sleep on, as a covering, as a shelter tent or in a variety of ways.

The color of the umbrella should be leaf-green. The covering should be sand- or earth-colored and should be dyed leaf-green on its upper third whence it should gradually fade to the original cloth color at about the center. Such a color scheme conforms to Abbott Thayer's law that animals are darkest where they receive the most light, and palest where they are most in shadow; and renders the blind much less conspicuous than if it were uniformly green or gray. It is not amiss to run belts of braid about the covering, sewing them to it at intervals and thus forming loops in which, when desired, reeds or branches may be thrust.

In erecting the blind, if circumstances permit, it is desirable to place the "door" toward the wind to insure better ventilation. When the situation is exposed, an additional stay or two may be required. If the camera box is not strong enough to sit on, a collapsible, artist's camp-stool should be added to the outfit. One cannot spend half a day

The Umbrella Blind at a Warbling Vireo's Nest

The covering is here secured to the edge of an ordinary umbrella, lacking the essential ventilation hole. (Shoal Lake, Man., June, 1901. See p. 319.)

in such close quarters and observe and record to advantage unless one is comfortably seated.

Within the shelter of this "cloak of invisibility," I have passed the most enjoyable and, I hope, profitable hours of my life as a field naturalist. There is a supreme and wholesome pleasure in feeling that one has reached a point of vantage from which the drama of animal life may be studied without the performers knowing that they are under observation. Wholly aside from the often thrilling novelty of

the experience and the thought that, even if unconsciously, one has been accepted as a part of the surroundings, there is a well-founded satisfaction in realizing that one is making an actual contribution to our knowledge of animal life, not based on the study of creatures in captivity, or of those placed under greater or less restraint by fear, but of animals in their native haunts, living their lives under absolutely natural conditions.

The Umbrella Blind near a Fish Hawk's Nest

The cover is here detachable. In addition to the guys, stones have been placed on the bottom of the cover to help stay the blind in this exposed situation. (Gardiner's Island, June, 1908. The pictures on pages 56 and 57 were made from the blind in this position.)

PART I.

TRAVELS ABOUT HOME

THE WAYS OF JAYS

A MORNING WITH MEADOWLARKS

BIRD-NESTING WITH BURROUGHS

A NIGHTHAWK INCIDENT

TRAVELS ABOUT HOME

INTRODUCTORY.

The nature of the work for which, in the main, the field studies herein recorded have been made, has led me to the more remote parts of our country ; but I should convey a wholly wrong impression of the possibilities of bird study, if I permitted this volume to appear without saying a word of the opportunities which lie within the reach of the local bird student.

Continuous and definitely directed observation is the secret of success in the study of bird-life ; and only that permanency of residence which permits us to keep a close watch on the species, through the year, and on the individual through the nesting season, will enable us to write an adequate history of its life.

I would emphasize the necessity of specialization. It may almost be said with truth that most of our knowledge of birds has been acquired by accident, so haphazard have been our methods of study. But, for this very reason, there is abundant opportunity for the student who, not content with a general knowledge of birds, determines to make himself an authority on some particular bird, preferably the one most abundant in his own neighborhood. If he does justice to his subject, he will never lack an outlet for his ornithological ambitions.

As has been intimated, circumstances have deprived me of the privilege of acquiring a more intimate knowledge of my own home birds and I cannot, therefore, present that type of bird biography which considers the bird throughout the year or during the season of its presence. Nevertheless, it

"With complete composure, perched beside her nest"

(Page 9)

is hoped that the sketches which are here given, will show what interesting facts are to be gathered at our doorsteps.

The story of the Blue Jays, for example, reveals as much of the bird mind as any experience I have had with birds. The little Meadowlark study required greater effort, for a time, than any other described in this volume and the results were valued proportionately. The photographic record of two days at " Slabsides " shows what interesting results may be obtained both easily and quickly. In short, to see old birds in a new light one has only to look at them through a camera.

Brown Thrasher

THE WAYS OF JAYS

If a pair of Blue Jays, whose home I chanced to find near mine, could relate to us the peculiar adventures that befell them one June day, there would be no excuse for my assumption of the office of scribe. But Jays, in spite of their powers of expression, use only the language of their kind, and if the tale is to be told, it must be by an interpreter.

Birds possess so many of man's mental attributes that the sympathetic student of their habits often, unconsciously perhaps, endows them with the mind of man entire, when, using the human parallel, the explanation of their every act is merely a matter of ingenuity or imagination. The result is often interesting, but quite as often misleading; good fiction, but poor natural history.

Now, the Blue Jay holds close kinship with the Raven, Jackdaw, Crow, and Rook, birds which, if classification were based on mental development alone, would, without dissent, be accorded a perch on the topmost bough of the avian tree of life. In attempting to assign reasons for a Jay's actions, the ornithologist is beset by unusual temptations, which, if it be the human side of bird life that appeals to him, he will find difficulty in resisting.

In the present instance, however, the facts in the case are irrefutably recorded by the camera, and the reader may accept or reject their explanation according to his belief or disbelief in the intelligence of individual animals. Facts like these emphasize the value of the camera as an aid to the student of nature. How comparatively unconvincing is the work of the artist, no matter how skilful his attempt to give form to something he has never seen. It is also to be noted, how attempts to photograph birds and beasts of necessity increase our intimacy with them. This, it is true, is not

work for the stroller and the dilettante naturalist, whose observations are made chiefly from the wayside, but for the earnest, enthusiastic student of nature, whose ardor in pursuit of her secrets is intensified by the possibility of actually capturing them, in such definite, graphic form that they become at once tangible additions to the sum of human knowledge.

Bird photography presents a fascinating but most difficult field for expenditure of effort. The beginner sees the successful results of another's work, and, knowing nothing of the failures, determines to "take bird pictures." The immediate outcome is doubtless a sacrifice of photographic material and also of bird life, as too great freedom with the nest surroundings, in the desire to secure better lighting, induces the bird to desert her home.

The would-be photographer, then, should master the technique of photography on such patiently immovable objects as houses, barns, or bridges, which will give fresh "sittings" when former ones fail, and then, when the problems of exposure, developing, etc., have been solved, he may go afield for wilder game.

One may pet or patronize, according to one's nature, a Chipping Sparrow, Bluebird, or Phœbe, but he is indeed well coated with self-esteem who does not feel a sense of inferiority in the presence of a Jay. He is such a shrewd, independent, and aggressive creature that one is inevitably led to the belief that he is more of a success as a bird than most men are as men. Conspicuous by voice and action during the fall and winter, when other birds are quietest, he becomes silent when other birds are most vocal. If he has a love song it is reserved for the ear of his mate. At this season, he even controls his fondness for owl-baiting, and with it his vituperative gifts.

The Robin, the Catbird, and the Thrasher seem eager to betray the location of their nest to every passer-by, but the Blue Jay gives no evidence of the site of his habitation by

being seen in its vicinity. He is not common in my region during the summer, and, connecting this fact with his secretive habits, I rejoiced with a bird-lover's joy, when systematic search resulted in the discovery of a Blue Jay's nest five feet from the ground, on the south side of a young pine tree. A better location from a bird-photographer's point of view, the birds could not have chosen.

The Blind and the Nest-Tree

The surroundings affording no opportunity for concealment from which the birds might be observed, an artificial bower of canvas, painted to resemble tree-bark, stretched over a light frame and liberally draped with poison-ivy vines, was erected within ten feet of the nest.

It was on the morning of June 3, that I set up my camera in this none too large or too cool shelter, with the object of recording somewhat of the home life of Jays. An hour passed. Occasionally a Jay's voice was heard from the

neighboring wood; one might have thought that the nest in the pine was deserted, had not five gaping mouths been tremulously raised at intervals in the supplicating attitude of the young birds' prayer for food.

At the end of an hour and a half, one of the parents suddenly appeared at the back of the nest. He, or she, was evidently suspicious. Who had parted the boughs that had previously concealed their home? What was this mass of disarranged vines at their threshold? Clearly something was wrong, and after a moment's stay, she—if she it was—slipped quietly out of the tree. Her alert but cautious manner seemed indicative of unexpected powers of discrimination and self-control. She did not voice her undoubted alarm at the changes observed, but without audible note, departed as noiselessly as she had come.

Even more surprising were the actions of the young birds. That they were exceedingly hungry was beyond question. Doubtless the parents, under normal conditions, visited the nest every few minutes, and the frequency with which the yellow-lined mouths had been opened during the preceding hour and a half, intimated an approaching famine. Still, under the stimulus of conditions which must have strongly suggested food, not one of the blind, naked little creatures gave evidence of life. It was an impressive exhibition of instinctive obedience to some, unheard by me, command. In the parent's absence, however, although without the incentive of her form above them, they showed no hesitation in making their wants known. Hence we may conclude either that the parents could not communicate with the young from a distance, or that the presence of one of the adults was necessary to insure obedience.

Believing that the Jays would not resume their family cares, I determined to experiment with them, and taking a mounted Blue Jay, I wired it to a limb below the nest. Blue Jays are pugnacious, and doubtless their anger at the intrusion of this stranger would outweigh their fear of the

bower, when I should witness the manner in which Jays evict an unwelcome guest. It was well that my reputation as a bird-student was not staked on the result. Scarcely had I returned to the bower, when one of the Jays reached the nest, and, to my complete astonishment, apparently paid no attention to the mounted bird, but at once carefully fed her young, whose eagerness now added to my wonder at their previous self-restraint. One visit, during which several, and perhaps all, of the young were fed, strangely enough satisfied their hunger, when the parent, with complete composure, perched beside her nest and slightly opened her bill, as birds sometimes do when at rest, forming as beautiful a picture of bird life as artist or naturalist could well desire. So completely had the mental attitude of the bird altered, that my movements in the bower were wholly ignored, and it was actually necessary to walk up to the nest-tree before she could be induced to leave her perch.

What had occasioned so complete a change in the bird's actions? Possibly it was not the same parent that had visited the nest so hurriedly; but if this one of the pair was so much the tamer, why had it not come to the nest during the hour and a half after I had entered the bower? Could the dummy bird below have been mistaken for its mate by the bird that perched so composedly above? It is true that the second one of the pair did not appear; but as neither of them went far from the nest, it is more than probable that the absent mate was within sight and sound during the whole proceeding.

We may resort to explanatory theories more or less plausible. The humanizer of birds might ask us to believe that the dummy Jay resembled a relative or dear friend of the nest-owners, from whom they were expecting a call that morning, though to my mind, the incident proved that the Jay could not distinguish the difference between a living bird and a poorly mounted one of its own species. However, be the explanation what it may, there can be no doubt that

the presence of that frowzy, stuffed Jay was wholly satisfactory and reassuring to the bird at the nest.

If these birds received one of their own kind so graciously, how would they treat a Screech Owl, a bird which, as far as human mind can discern, is the common enemy of all Jays? The dummy Jay was therefore removed, and a mounted Screech Owl was securely fastened about two feet from the nest. The Jays were not visible, but that they were watching my movements from the neighboring wood, was shown by the tense note of alarm they uttered almost as soon as the Owl was posed—a high, shrill call, differing from any I had previously heard.

"From near-by limbs they shrieked notes of defiance"

The moment I entered my bower, a Jay came to the nest-tree, screaming in alarm at the unconscious, yellow-eyed bunch of feathers so dangerously near its offspring. Soon it was joined by its mate, and with uncontrolled fear and excitement they flew from limb to limb, but, much to my surprise, made no attempt to attack or even threaten the Owl and, after a minute or two of wild flitting and calling, they returned to the woods. Surely this was enough to destroy one's confidence in our supposed knowledge of the Jay's character; but the birds soon further illustrated the danger of theorizing.

While the supposition credits them with a power of reasoning I am not prepared to say they possessed, their sub-

sequent actions seemed strongly to indicate that they had mentally grappled with this wholly unexpected problem which had so suddenly confronted them, and, after due consultation, had reached certain conclusions upon which they acted. In any event, the incident serves well to illustrate the ease with which one uses the human parallel in describing the conduct of animals, from the point of view of the sympathetic observer eager to recognize human traits in bird and beast—indeed, to claim kinship with them.

In this particular instance the Jays had already thoroughly aroused my interest, and it needed little imagination to put myself in their place and conjecture my own actions if, without a moment's warning, I should see the ogre of my tribe, a creature whose power experience had taught me to fear, standing at my threshold. That I should for a time lose my self-possession and perhaps call aloud in alarm would seem wholly natural, and in view of the superior strength and armament of the enemy, it would also be expected that I should consult the partner of my joys and sorrows, and now companion in arms, as to the most expedient method of conquering this intruder without undue risk.

"Screaming in alarm"

Be this as it may, after flying about the nest-tree for several minutes in the wildest and most aimless, and excited manner, the birds deserted the place and retired to the woods. Then I heard them uttering for the first time the low, conversational *eck, eck, eck*, note of their kind. It is a note

which I have never heard from a solitary Jay, and is probably used for purposes of intercommunication. One frequently hears it from a party of Jays when they are gathering chestnuts or acorns.

For ten seconds or more the discussion, if discussion it was, continued, and at the end of this time a plan of battle had evidently been decided upon, which they lost no time in translating into action. They returned to the nest-tree, not

"Placed them in a row on the limb of a neighboring pine tree"

now a screaming pair of excited, frenzied birds which in the control of an unheard-of experience had completely lost their heads, but two determined, silent creatures, with a seemingly well-fixed purpose. The difference in their actions, when the two visits to the nest were compared, was in truth sufficiently impressive to warrant a belief in the birds' ability to grasp the situation intelligently.

Without a moment's hesitation, one of the pair now selected a perch above the Owl, paused only long enough to

take aim, and then, with a flash of wings, sprang at its supposed enemy. What followed, the camera, although set for a hundredth part of a second, failed definitely to record. The heart of the little pine seemed rent by the explosion of a Blue Jay. It was no feint, but a good, honest blow delivered with all the bird's force of body and pinion, and the poor little Owl was completely vanquished, upset, at the first onslaught. The Jay had given a most convincing exhibition of the highest type of courage; it had mastered its fears and deliberately gone to battle. I felt like applauding.

But its troubles were not ended. This was a peculiar kind of Owl, different, doubtless, from any that the Jay had ever before encountered. It was conquered, but instead of flying away to some dark nook to nurse its wounds, it persisted in remaining on the field, retaining its grasp of the limb, not upright, however, but hanging upside down, as no Owl was ever seen to do before, and, indeed, as only wired Owls could. Such unheard-of behavior excited the Jays even more than the Owl's first appearance and, from nearby limbs, they shrieked notes of defiance until, in mercy to their throats and my ears, I removed the cause of their alarm, bent the branches back to conceal their nest, and left them to discuss their remarkable experience at their leisure.

Ten days later, when I parted the pine-boughs, I could with difficulty believe that I saw the same nest. In place of five skinny, naked, sightless, squirming creatures, were five plump, well-feathered, bright-eyed birds almost as large as their parents. They had grown mentally as well. The sense of fear had developed and, as I looked at them, with a common impulse they jumped from the edge of the nest and fluttered to the ground below. Disregarding the protests of their parents, I gathered them together, placed them in a row on the limb of a neighboring pine, and then addressed them in what I esteemed to be the tongue of their tribe.

Perchance in this narrative both the speech and the actions of Jays have been misinterpreted, but in this conclud-

ing scene of our relations, the most skeptical could not doubt that I was not only intelligible, but eloquently expressive, to the five birds on the limb, which, in quick response to my question, "Are you not very hungry?" lifted up their heads in a mute but unanimous and unmistakable "Yes, indeed we are."

"Yes, indeed we are"

A MORNING WITH MEADOWLARKS

A field which I " sowed down " a year or two ago, is considered a failure by my farmer neighbors; but, if the crop of grass is poor, I have at least raised a fine brood of Meadowlarks. For years these birds have not nested in the immediate vicinity of my home, and to have them take their old place in the choir of June songsters, was assuredly as large a return as one should expect from a few pecks of hay seed.

Although one of the birds was seen with nesting material on May 9, 1908, so shy were they, that their nest was not found until June 13, when it contained young almost ready to fly. The birds ranged over an area about four hundred yards in diameter and, on appearing, even as a casual stroller, in any part of their territory, I was certain to be greeted by the *dzit or yert,* with the succeeding rolling twitter of the male's alarm note; and so evenly did he distribute his anxiety that, from his actions, I could not have told in what part of his habitat the nest was placed. But from the concealment of a cart, the food-flight was followed, until it led repeatedly to a certain corner of the new grass field, when a rapid run, after the bird was down, revealed as it arose, the particular bunch of red-top which sheltered the domed nest and its nearly fledged young.

I do not recall ever having seen a photograph of a Meadowlark at its nest; and the bird's success in avoiding the trap of the camera hunter is no small tribute to the keenness of its powers of observation and discrimination.

That the trap has been set, I know from my own experience, as well as that of others; but, the birds are so suspicious, that the most carefully concealed camera near their nest is sufficient to keep them away. On May 9, at Bloomington, Indiana, I attempted to photograph a sitting Mea-

dowlark and, although the camera was so well hidden that she returned to her nest without hesitation, I could not get near enough to it to make an exposure before she left her eggs. A thread over two hundred feet in length was attached to the shutter and was so arranged that I could reach the end of it without being seen by the sitting bird; but invariably she left her nest before I reached that part of the field where the thread was placed, and I finally concluded that her movements were governed by the notes of the male, who, ever on guard, uttered his alarm as soon as I appeared.

Realizing, therefore, that the birds in the grass field could be studied at close range only by using the utmost caution, I erected the umbrella blind at night, placing it twenty feet from the nest and surrounding it with branches of wild cherry. To further avoid arousing the birds' suspicions, I entered the blind at 3:30 the following morning, just as the first notes of the Robins' morning song aroused the birds to their matins.

The first sign of life at the Meadowlarks' nest was noted at 4:10, when the female, who had evidently passed the night with her family, was seen cleaning the nest—an admirable way, surely, to begin the day. A moment later she left the nest, flying so near the blind that I could hear the rush of her wings. The blind, therefore, was accepted without question as a feature of the landscape. It had been erected without alarming the birds; I had entered it unseen; it was wholly without human associations and as an inanimate object did not arouse the birds' suspicions.

At 4:25, the female returned with food and, from this time until 6:34, she visited the nest sixteen times, on each occasion feeding one bird and occasionally two, and with one exception, always inspecting the nest and taking with her the sac-enveloped excreta, which, if left, would soon have rendered the nest uninhabitable.

The male, from his favorite perch on a red cedar in the neighboring fence-row, greeted the female on her first jour-

"The male started nervously"

ney from the nest, by beginning to sing at 4:20. From this time until 6:43, he sang almost continuously, when, his morning devotions being concluded, he joined his mate in the more practical work of grub-hunting.

Between 6:43 and 11:05, when I left the blind, the birds visited the nest forty times. Almost invariably the male, on leaving, flew directly to one of his several song perches,

and sang from five to seven times before searching for food; but, in spite of this handicap, he fed the young as often as the female, both making twenty visits. The female, unaided, thus fed the young at the rate of about once in eight minutes but when both sexes were at work, the rate was increased to once every six and a half minutes.

Inspection After Feeding

There was a more or less regular alternation of sexes in the visits to the nest but, in three instances, both the male and female visited the nest twice in succession. On only two occasions did the parents meet at the nest; once they came together when the male fed first and flew away, and once the female came just as the male was leaving. In each case he greeted her with a bit of song as he left, and this was at

once followed by the full song from one of the fence-row perches; those two were the only times when he uttered a note near the nest.

The birds dropped down to the nest from above, and always departed toward the east. They came and went freely, without hesitation, and were evidently acting in a wholly natural manner. Still, they were never off guard, but were keen and alert, as though living in the enemy's country. A gentle snap of the fingers was sufficient to alarm them, and the male started nervously at an insignificant noise made near my house, two hundred yards away.

It was deemed unwise to remove much of the grass concealing the nest, and the pictures do not, therefore, show the young. The following day they had gone. The male continued to sing until early August, and I imagine that a second brood was reared.

BIRD-NESTING WITH BURROUGHS

When two men whose combined years exceed five-score, can go a-bird-nesting with an enthusiasm which knows no decrease, and count mere discovery a sufficient reward for hours of searching, the occupation is evidently worthy of investigation by every boy who would prolong his youth.

I say boy advisedly, for the bird-nesting habit is not to be acquired in later life, and, indeed, had better never be acquired at all if its object be the taking of the nests and eggs. One does not search for a new or beautiful flower to uproot and destroy it, but to admire it, and to cherish the memory of its perfections until, with returning spring, it renews itself and our delight in its existence.

Bird-nesting, then, does not mean egg-collecting. The latter holds no antidote for age, but loses its powers as gratified desire checks species after species off the list, or increasing years bring a realization of its folly.

Your true bird-nester values his good fortune too highly to rob the nest and himself at the same time. The discovery of a bird's nest is the discovery of a bird's home with all the fascinating possibilities attending the study of a bird's home life. It is an event. One never forgets the circumstances attending the finding of any but the commonest birds' nests. The species then becomes the individual. One may claim an actual acquaintance in the bird world and perhaps establish personal relations with some feathered neighbor, whose family affairs become matters with which he is intimately concerned.

Furthermore, that almost universal heritage, the hunting instinct, finds a natural outlet in bird-nesting. The farmer's boy who hunts hens' nests just to triumph over some particular fowl whose eggs have long defied search,

exhibits, in primitive form, the motive which impels one again and again to look for the nest of a more or less common bird whose home has been discovered many times before. And, finally, as Mr. Burroughs has said, "Bird-nesting is by no means a failure even though you find no birds' nests. You are sure to find other things of interest, plenty of them."

A Phœbe's Nesting-sites

Perhaps, after all, this is the secret of the perennial charm of bird-nesting. The discovery of the nest is only the crowning event of a quest which has been filled with pleasant incidents. Certain it is that in the outing here briefly described, there were "other things of interest" besides birds' nests and "plenty of them," too. First among them was the presiding genius of "Slabsides;" one could not imagine a fitter companion with whom to go a-nesting; for, be the paradox especially noted, the enjoyments of nest-hunting are doubled when you halve them.

Then there was Slabsides itself, ideal haunt for man and bird, and round about were inviting wooded hills, with here and there cultivated valleys between them and, not far away, fields and orchards.

Through these pleasantly varied surroundings, on the morning of June 16, 1900, we wandered, visiting old acquaintances as well as searching for new ones. It was not to be expected that a passing tour of observation and inves-

tigation should yield results of unusual interest or scientific value, and I have nothing more important to record than the mere joy of seeing and discovering objects which never fail to excite a bird-lover's enthusiasm; with the added satisfaction of being able, in some instances, to picture far more graphically than could be done with pen alone, the scenes from bird-life which are here presented.

The difference between casual and continuous observation is eloquently illustrated by our comparative knowledge

"She was peacefully sitting"

of the first bird we visited—the Phœbe. To me, she was interesting simply as a Phœbe who had occupied a new nesting-site the first season it was available, and already had become so accustomed to man that she permitted herself to be photographed at short range; but this was only the final incident in her known history.

For a number of years, so Mr. Burroughs tells us in "Bird-Lore," a pair of Phœbes, presumably the birds in question, had occupied a nesting-site beneath a rocky ledge, at the side of the valley in which Slabsides hides. The present year, they returned as usual and, when the

eggs were laid, Mr. Burroughs permitted a boy visitor to take one for his collection. Whether this fact was in any way connected with the fate of the nest or not is unknown, but, it is certain that the remaining eggs were soon missing and the nest deserted.

Shortly, they selected a new home on the horizontal beam of the piazza of a recently erected dwelling overlook-

Landlord and Tenant

ing the valley. Here, the rafters divided the beam into ten spaces, all of which, to the Phœbe, evidently looked alike. She began a nest in one of these spaces, but on returning with more building material, missed her aim, so to speak, and began a second nest in another space. This mistake was repeated until the bird had five nests in process of construction at the same time. Probably she would not have completed any one of them, if Mr. Burroughs had not covered four with stones. The bird was then forced to focus on the fifth, which she eventually finished and on which she was peacefully sitting at the time of my visit.

"In the low sweeping limb of an apple tree"

Doubtless Mr. Burroughs could have given equally interesting accounts of other of his bird neighbors to whom he introduced me that day and the next, and whose portraits I present with only passing comment.

The Hummer, for instance, which, with rare consideration for the needs of bird photography, had placed her nest in the low sweeping limb of an apple tree, was an old acquaintance of his, and no detail of her domestic affairs, from

Hummer Feeding Young

the building of the nest to the appearance of the young, had escaped him. Acquaintance, I say, rather than a friend, for in spite of the fact that her nest was within a few feet of a pathway, the suspicious little creature invariably darted from it whenever any one approached within twenty feet of her. However, she returned in four or five minutes, sometimes alighting and settling in the nest as though with one movement, at others perching on its edge, when the two surprisingly short bills of her half-fledged young could be seen projecting slightly beyond the rim of their downy home. This pose preceded what Mr. Torrey has so well described as the "frightful looking act" of feeding, of which the accompanying picture shows the attitude assumed by the parent.

Just at this point I take occasion to introduce a picture made later in the season, of a Hummer poised before a flower. It serves very well to represent the appearance of Mr. Burroughs' bird while visiting his honeysuckles, gathering food for her young. It will be observed that the filmy halo, constituting the wings of the Hummer in flight, does not appear in this picture; nevertheless the exposure was made, if my focal-plane shutter scale does not prevaricate, in less than an eight-hundredth part of a second.

"Paused before a flower"

On one occasion, we observed another Hummer in the vicinity; the bird flew directly up to the one on the nest, and evidently looked her straight in the eyes, but for so small a fragment of time that we do not know whether it was male or female. At any rate, the stranger seemed to be quite familiar with the air-line to the nest, though, as Mr. Burroughs said, it is possible that Hummers may have an eye for Hummers' nests.

Far less approachable was a Flicker, which when we tapped gently at the base of her home in an old cherry stub, left the exit above, with a precipitation defying the speed of a lens shutter. While technically a failure, the picture of her hasty departure, nevertheless, forms an interesting study in the use of the wing in flight. It will be observed that, although a third of the bird still remains in the hole, the wing is extended to a surprising degree and is already in motion, as is shown by the failure of the lens to record

Flicker Leaving Nest

the outer primaries while securing, with some detail, an outline of the secondaries. Indeed, the evidently much higher speed with which the primaries were being moved, together with the space shown in the picture between the outermost secondary and innermost primary, suggest the possibility of an independent movement of the distal portion of the wing A close examination of the negative shows that the outer

primaries are spread out fan-like, to such an extent as to be in contact only at their bases. Profiting by experience, this bird subsequently left her tree before one could approach near enough to plant a camera.

The following morning was devoted to securing the picture of a Scarlet Tanager, whose home had been discovered by a good type of the all-seeing farmer's boy. Neither conditions of location, site, nor light were favorable, and after the camera had been fastened in the apple tree which the birds had selected for a home, it was found necessary to build a blind of bushes beneath a neighboring tree, whence the photographer could not see his subject. From a distance, therefore, with the aid of a glass, Mr. Burroughs kept watch and gave word when the exposure was to be made.

Male Scarlet Tanager About to Feed Young

A NIGHTHAWK INCIDENT

A discussion of the specific distinctness of the Whip-poor-will and the Nighthawk, following an address to Connecticut agriculturists, some years ago, led to my receipt the following July, of an invitation from a gentleman who had

Nighthawk and Young

been present, to come and see a bird, then nesting on his farm, which he believed combined the characters of both the Whip-poor-will and Nighthawk; in short, was the bird to which both these names applied.

Tempted by the opportunity to photograph the bird, as well as to establish its identity, I boarded an early train for Stevenson, Connecticut, armed with Museum specimens of

the Nighthawk and Whip-poor-will as well as the necessary photographic apparatus.

The former were accepted as incontrovertible evidence and my host readjusted his views as to the status of the birds which they represented. We may, therefore, at once turn our attention to the Nighthawk which was sitting patiently on a bit of granite out in the hay fields. The sun was

"Spread herself out on the grass at my feet"

low when we reached the flat rock where she had been last seen, and on which her eggs had been laid and her young hatched, but a fragment of egg-shell was the only evidence that the bare-looking spot had once been a bird's home. The grass had lately been mowed and there was no immediately surrounding cover in which the bird might have hidden. It is eloquent testimony of the value of her protective coloring therefore, that we almost stepped on the bird, which had moved to a near-by flat rock.

Far more convincing, however, was her faith in her own invisibility. Even the presence of a dog did not tempt her to flight, and when the camera was erected on its tripod within three feet of her body, squatting so closely to its rocky background, her only movement was that which was

occasioned by her rapid breathing. Another cause, however, beside the belief in her own inconspicuousness held her to the rock; one little downy chick nestled at her side, and with instinctive obedience it was as motionless as its parent.

Nighthawk on Fence

So they sat while picture after picture was made from various points of view, there being no movement, until the parent was lightly touched, when, starting quickly, she spread her long wings and sailed out over the fields. Doubtless she was startled and deserted her young under the impulse of sudden fear. But in a few seconds she recovered herself and, circling, returned and spread herself out on the grass at my feet. Then followed the evolutions common to so many birds but wonderful in all. With surprising skill in mimicry, the bird fluttered painfully along, ever just beyond my reach until it had led me a hundred feet or more from its young, and then, the feat evidently successful, it sailed away again, to perch first on a fence and later on a

limb in characteristic, lengthwise, Nighthawk attitude.

How are we to account for the development in so many birds of what is now a common habit? Ducks, Snipe, Grouse, Doves, some ground-nesting Sparrows and Warblers, and many other species, also feign lameness, with the object of drawing a supposed enemy from the vicinity of their nest or young. With each one there is the most admirable adjustment of means to the end. Hasten your pace and the bird hastens hers; slacken yours and the bird goes slower. She is always at your finger tips. She takes the utmost possible risk in the effort to deceive you into believing that at the next step the prize is yours. Are we to believe that each individual who so cleverly opposes strategy to force does so intelligently? Or are we to believe that the habit has been acquired through the agency of natural selection and is now purely instinctive?

"In characteristic, lengthwise, Nighthawk attitude."

PART II.

THE BIRD-LIFE OF TWO ATLANTIC COAST ISLANDS

GARDINER'S ISLAND

COBB'S ISLAND

First-growth Oak Forest on Gardiner's Island

THE BIRD-LIFE OF TWO ATLANTIC COAST ISLANDS WITH A WORD ON ISLAND BIRD-LIFE

INTRODUCTORY

So far as my experience goes, *all* colonial, ground-nesting birds breed only on islands. Among North American species this is true of the Auks, Murres, Puffins, Guillemots, Gulls, Terns, Skimmers, Petrels, Tropic Birds, Gannets, Cormorants, Pelicans, and Flamingos. Bank Swallows alone might be excepted.

With many Loons, all Grebes, Coots, Gallinules, Cranes, Black Terns, and some Ducks, the nest is placed in the water and is an island in itself.

While many of these birds are born feathered and leave the nest shortly after hatching, they are dependent on their parents for food until they acquire the power of flight. But terrestrial nesting habits and a period of helplessness on the ground, whether in or out of the nest, do not in themselves require the protection of insular life. Ducks, Snipes, Plovers, Rails, all gallinaceous birds, Goatsuckers, Larks, Pipits, many Sparrows, some Warblers and Thrushes nest on the ground; and with the last five groups mentioned the young are born naked and are reared in the nest.

It is, therefore, more to that gregariousness which brings great numbers of birds of one species into limited area to breed, rather than to the nature of the nesting-site or the condition of the young at birth, that we must attribute the necessity for an island home. Birds of colonial habit lay all their eggs, so to speak, in one basket. During the nesting season, the individuals of a wide area are focussed in a

small space. To find one nest means, practically, to find all. To a large extent, the lot of one is the fortune of its neighbors.

Weasels may find one or more nests of Sandpipers or Sparrows in Massachusetts, and devour the contents without materially affecting the status of the species in that state but the same animals on Penikese or Muskeget, would, in time, doubtless anihilate the Terns which nest there.

Wild cats, in Florida, probably never miss an opportunity to capture a sitting Wild Turkey, but there is no evidence to show that the numbers of Wild Turkeys in the state has ever been seriously affected by this habit. The same animals, however, on Pelican Island would soon put an end to all the breeding Pelicans of eastern Florida.

Even with arboreal species, gregariousness, while nesting, often appears to require some form of insular isolation; and we usually find colonies of Cormorants, Anhingas, Spoonbills, Ibises and Herons, breeding on islands or in trees which are growing in water and are themselves islands.

When, therefore, we review the islands of our Atlantic Coast, from the Gulf of St. Lawrence to the Florida Keys, we will not be surprised to discover how many birds, which, widely distributed at other times of the year, owe their existence to the protection island life has accorded them in the nesting season.

On the Bird Rocks and Bonaventure are found our sole remaining Gannets (*Sula bassana*); on Old Man's Island, off the Maine coast, are the only Eiders nesting in the United States; Penikese and Muskeget held for a time our only large colonies of Terns; Martha's Vineyard shelters the last of the Heath Hens and the only Least Terns known north of the Carolinas; Gardiner's Island is distinguished by its Piping Plover and Black Ducks; Cobb's Island has almost the last of the Gull-billed Terns, and Pelican Island has the only nesting Pelicans of the eastern coast of Florida.

Some of these islands are mere rocks or sandbars, with few or no human inhabitants and consequently by just so much, are the more habitable for birds. But if we should extend our survey to those larger bodies of land on which true island conditions exist, we should find the results of this protecting influence even more strongly manifested, as where a family has been preserved in the Greater Antilles or an entire fauna in Australia.

Long-continued insular isolation, often under special conditions of environment, has resulted in the development of new species. We shall find evidences of this kind of evolution in the Bahamas, but northward on our coast, if we except certain slightly differentiated forms in the Bermudas, only Sable Island, off Nova Scotia, appears to have produced a bird of its own; the Ipswich Sparrow being restricted to this islet, where possibly it represents the Savanna Sparrow of the mainland.

Not only new species but new habits may arise on islands. Environment is the mold in which habit is cast, and such variations in the mold as may readily occur on islands are quickly reflected in its product. The nest-building habits of the Ospreys on Gardiner's Island, and of the Pelicans on Pelican Island, are cases in point.

Of the two islands whose bird-life is sketched beyond, one is comparatively large with diversified topography and flora and correspondingly rich avifauna; the other is small and composed of only beach and marsh, but both show the preserving powers of insular life, by the presence on them of birds which have virtually ceased to breed in the adjoining regions.

Morton wrote of New England birds in 1632, of "cranes there are a great store * * * they sometimes eate our corne and doe pay for their presumption well enough * * * a goodly bird in a dishe and no discomodity." Of "swannes," this early natural historian tells us, "there was a great store at the seasons of the year." Other water-fowl there were in countless myriads, and among them were Labrador Ducks, White Pelicans, and, not improbably, Great Auks. Trees fell beneath the weight of roosting Wild Pigeons, which, in flight, darkened the air, and, in proper localities, Heath Hens, the eastern Prairie Chicken, abounded.

It was not a day when close attention was paid to natural science, and we shall never definitely know the conditions of bird and mammal life which existed at the time this country was colonized; but, from records similar to those which Morton and others have left us, we gather that surprising changes have occurred in the character of our bird-life during the past three hundred years. Not only, as we know too well in our own generation, have many species become greatly reduced in numbers, but others have totally disappeared, or are seen only at long intervals as waifs from some region in which they have not as yet become exterminated.

The present-day ornithologist reads the time-discolored pages of these pioneers with the keenest regret that the scenes they describe can never be observed again. Imagine, then, my exultation on discovering that, within one hundred miles of our most populous city, there is still a considerable area where, if there is not a "great store of cranes,"* the

* Morton wrote of a true Crane of the genus *Grus;* not of our Great Blue Heron (*Ardea herodias*) to which the name "Crane" is often applied.

existing conditions are so unlike those commonly prevailing throughout the surrounding region, that the observer may easily fancy himself transported to the early part of the last century.

Only an island could so actively play the part of preserver. No fence, no trespass sign, no warden is so effective as several miles of deep water. Of no less importance, in the present instance, is the possession and occupation of this fair land by but one family, its descendents and dependents, since Lion Gardiner purchased it from its red-skinned owners in 1637, for, it is said, "ten coats of trading cloath." Here, then, is the prime requisite of isolation rendered potent and continuous by sympathetic guardianship.

Seven miles from end to end and, in the middle, one-third as broad, Gardiner's Island contains 4000 acres; an area more than sufficient to supply the needs of its occupants, and large tracts are still in a primitive condition. We have, then, the advantages resulting from nature primeval as well as those arising from man's cultivation. The first is represented by shell-strewn beaches, grassy marshes mirrored with ponds and seamed with inflowing arms of the sea; rolling plains, dense thickets of cedar, bay berry, and cat brier; magnificent first-growth, hard wood forests, now high and dry, now watered by singing brooks, again low and swampy with luxuriant vegetation and green-coated pools. On the other hand, man's presence is made manifest by abundant crops of grains and fruits, of which the birds reap a by no means undeserved share.

With these benefits, conferred by man, are none of the ills which invariably follow him. There are no rats in this island Eden and, more astonishing still, there are no cats, the ogres of the bird-world. No less remarkable, and perhaps an accompaniment of insularity, is the absence of foxes, minks, weasels, opossums, red squirrels and chipmunks, all natural enemies of birds, and when the Fish Hawks come in the spring, virtually all other Hawks depart. In short,

this island is an ideal resort for the fowl of land or water—a place of peace and plenty—and only those factors which impel migration amongst most of our birds, and consequent exposure to an endless series of dangers, have prevented it from becoming a vast aviary.

Fortunately removed from beaten paths of travel, one cannot buy an "excursion ticket" to this Island of Birds

The Signal at the Fireplace

but, journeying part of the way by train, one must secure such conveyance as his alighting place affords, and drive seven miles over country roads and grassy lanes to a look-out point where his haven marks the horizon three miles across the waters. Here, at the Fireplace, as it is called locally and on the larger maps of Long Island, I enlisted in my earlier visits, the services of the official fire-maker, to build a fire whose smoke should give notice of a visitor to the island beyond. The office is hereditary and had been held by the man's great grandfather before him. Shortly a dense cloud arose from a smudge of hay and seaweed and was blown landward by the breezes from the Montauk. In time came the answering signal, a flash of light from shining tin, gleaming intermittently like the rays of an arc-light, and shortly, through one's glasses, a boat was seen crossing the bay. A telephone now supplies more certain if less pic-

turesque means of communication, and the Fireplace exists in name only.

Without going into detail, it is a difficult task to write adequately of the bird-life of Gardiner's Island, but several facts soon impress the student—first, the abundance of birds; second, the presence of species rare or known only as migrants on contiguous land areas and, third, the departure of some species from the normal habit of their kind. Robins, for example, build their nests not only in every tree and bush about the place but in exposed positions, on the projections of piazza supports, on fence-rails, without attempt at concealment, at the end of corded wood logs, and even on stones beneath foot-bridges. How would they have progressed with housekeeping arrangements if sleek, sometimes purring tabbies were interested spectators of their labors?

Other common dooryard birds are Catbirds, Orioles, Chimney Swifts, Chipping Sparrows and Barn Swallows. Flickers, Quail and English Pheasants all nest within a few yards of the home dwelling, the former finding the fence-posts admirable substitutes for hollow trees. House Sparrows, with their usual discretion in selecting desirable homes, swarm about the manor house, their harsh chatter being the one discordant element in the life of the island. The abundance of these birds probably accounts for the absence of House Wrens and Bluebirds from a habitat which, in other respects, would be exceptionally suitable for their occupation. Competition between the Sparrows and these birds occurs in the selection of a nesting site and, the Sparrow being permanently on the ground, ever has the nine points of possession on his side.

Scarce a stone's throw away, colonies of Purple Grackles and Red-winged Blackbirds add their characteristic notes to the chorus of bird voices, the volume of which so impresses the bird student from less favored regions. In the openings of a near-by tree and bush-grown pond, if the

resident Kingfisher does not give the alarm, a Black Duck with her brood may be seen, and, more rarely, one may catch a glimpse of a radiant Wood Duck, floating on the clear brown water. At dusk, the whistling of a Woodcock's wings and the momentary sight of the birds rapidly flying to fresh feeding grounds, adds another game-bird to the list.

In the grass-grown fields, ready for the mower, and on the rolling plains where sheep graze, are Meadowlarks, Vesper, Field, Savanna and Grasshopper Sparrows, with Kingbirds and Indigo Buntings in the bordering tree-lines.

From every side comes the splendid, vigorous whistle of Bob-White, and often the singer may be seen, perched on the top rail of a fence, replying in kind to a rival, occupying a similar position on the other side of the field.

Approaching the borders of the woods, where thicket growths encroach upon the fields, one is sure to have the always startling experience of flushing an English Pheasant; and in the morning and evening, the little, immature, bantam-like crow of cock Pheasants is a distinctly strange and foreign note.

In spite of its abundance, the novelty of this bird's appearance does not wear off. As, with a cackle and a roar of wings, the bird seemed to burst from the earth, I invariably paused to watch the magnificent creature rise, rocket-like, and sail away into cover; nor did one think of moving until it was lost to view. The manner in which a cock Pheasant can conceal himself where there is apparently not sufficient cover for a Sparrow, was a never-ending source of wonder. Scarcely less astonishing than the flight of the adult Pheasants is the wing-power of the chicks. When evidently not more than two or three days old, they fly with a speed and certainty of aim which quickly carries them to the near-by shelter. The sitting females are exceedingly wary, leaving the nest with but little cause and returning with much caution. The picture here presented was secured only after the camera had been set for a day and a half.

Pheasants were introduced on Gardiner's Island in 1892, when twenty-five females and one hundred males were released. In 1893, two hundred females, one hundred males, and one hundred and fifty birds of both sexes, bred by hand on the island, were turned out. This constituted the entire stock, which, responding to the exceptionally favorable conditions, increased so rapidly that, at the end of eight years, the Pheasant population was estimated at about 5000 birds. During this period, some three or four hundred cock birds —and cocks only—had been shot each fall.

Sitting Pheasant

The birds now began to decrease. Some contracted a disease resembling roup, with which the Crows on the island were afflicted. The gamekeeper, Hiram Miller, thinks that possibly the food supply on the island was not large enough to maintain the maximum number of birds; while George E. Lodge, the English artist and ornithologist, who accompanied me to the island in November, 1907, suggested that—as

Terns Nesting on Drift-weed

in England, old and barren hen Pheasants are known to molest sitting birds—the practice, on Gardiner's Island, of shooting no females may have rendered incubating birds subject to disturbance by their elders of the same sex. However this may be, the fact remains that, without any evident cause for the decrease, there are not more than half as many Pheasants on the island in 1908 as there were in 1900, and it is now proposed to put out one thousand more birds.

The woods and wood borders, in addition to the Vireos, Scarlet Tanagers, Ovenbirds, Chats, Wood Thrushes and other common species, hold as tenants numerous Carolina Wrens, a southern species whose loud, ringing, musical

whistle adds an unexpected bird voice to the chorus of June song. Reaching the regular northern limit of its range in northern New Jersey, this bird is known only as a rare straggler on Long Island; but it appears to have become permanently established on Gardiner's Island, where half a dozen may be seen or heard on any morning's walk; its characteristic notes give form to mental pictures of southern woods, made still more real by the guttural, lisping gurgle of the Parula Warblers, nesting in the thick bunches of usnea moss.

Common Tern
The bird was sitting on seven eggs

Where swamp maples grow in low flooded woodlands, several hundred Night Herons build their rude platform nests of sticks, high in the branches. As, with frightened squawks, the old birds leave the home tree, one might imagine one had invaded a hen-roost. In early June, the streaked young are nearly grown, and sit in rows of three and four on the limbs near the frail structure in which they were reared, waiting for the impulse which will bid them use their newly grown wings.

The absence from the woods of Blue Jays, Rose-breast-

ed Grosbeaks and Veerys, where all the conditions are apparently favorable, is so marked as to call for an explanation, but I am unable to suggest one.

In June, 1908, Mr. Winthrop Gardiner showed me a pair of Bartramian Sandpipers or "Upland Plover," which were evidently nesting on the plains, and his father, Mr. John Lyon Gardiner, tells me that this species was once abundant there.

The well-named Piping Plover is still a common bird on the beach at both the northern and southern ends of the island, where possibly fifteen or twenty pairs of these little sand-colored birds nest. Here, also, are two colonies containing several hundred of the Common Terns which were once so numerous on the south shore of Long Island. On July 5, 1901, I saw seven Roseate Terns in the south end colony. At this time, young Terns, several days old, were running about, apparently, wherever they pleased, attended by their parents. Several were seen to enter an inflowing creek, drink repeatedly of the salt-water and swim actively, in evident enjoyment of their natatorial powers, while the parents, who rarely alight on the water, watched them from the shore. Possibly here was an explanation of the value to Terns of webbed toes. Functionless in the adult, they are of service to the young before the power of flight is acquired.

Herring Gulls, chiefly in immature, gray plumage, appear to remain on the island throughout the summer, and flocks of fifty or more have been observed on each of my visits at that season.

At both ends of the island there are extensive salt marshes with numerous ponds. Here, Sharp-tailed and Seaside Finches are abundant, while to the ponds, the Black Ducks, about forty pairs of which are said to nest on the island, resort with their broods.

But the birds for which, among naturalists at least, Gardiner's Island is famous, are the Fish Hawks, or Ospreys.

The island furnishes them with a safe retreat to which, year after year, they may return and find their bulky nests undisturbed, awaiting them, while the surrounding waters afford an unfailing supply of food. Among the birds, they are the lords of this land. If their title could be searched, even the early, red skinned islanders would doubtless be found to have been trespassers.

If the Fish Hawks cannot prevent man's presence, they can and do deny to any other member of the Hawk family the right to share their summer home; and while the Fish Hawks are there, one may usually look in vain for Hawks of other species on Gardiner's Island. One Marsh Hawk is the only raptor I have seen on there in summer, and Mr. Winthrop Gardiner reports a Red-tail.

While on the island, therefore, the Fish Hawks appear to have no enemies. The Terns sometimes dart at them threateningly, but, beyond ducking their heads as the sharp-billed, active birds sweep by, they pay no attention to this source of annoyance. From the manner in which they pursue the Black-crowned Night Herons and Green Herons, one might imagine that they had an old score to settle with these birds; but the Herons are probably as innocent of offense against the Fish Hawks as the latter are against the Terns; in each case, the attack is that of a more active or stronger bird against a less agile or weaker one, and is doubtless a purely malicious exhibition of power.

Since the publication of Alexander Wilson's "American Ornithology," the Fish Hawks of Gardiner's Island have figured in the literature of ornithology and it is characteristic of their delightful home that, owing to the preserving influences of insular life, the birds are apparently nearly as abundant there to-day as they were a hundred years ago.

The volume (Vol. V.) of Wilson's work in which the Fish Hawk is treated, appeared in 1812. In it the Mr. Gardiner who was then proprietor of the island, is quoted as saying that there were at "least three hundred nests of Fish

Hawks that have young * * *." To-day I estimate the number at between one hundred and fifty and two hundred, but the difference between these figures and those of 1812, may be less real than one due to errors in estimate. In any event, Gardiner's Island holds the largest Fish Hawk colony in this country—possibly the largest in the world—and the conditions under which many of the birds nest, offer exceptional opportunities for a study of their habits.

Mr. Gardiner tells me that the Fish Hawks arrive on the island, March 20, and depart on September 20. That the same birds return year after year to the same nest, is beyond question, and, in at least one instance, this belief was proven true by Mr. Gardiner's grandfather, who placed a metal band on the tarsus of a Fish Hawk which, for many subsequent seasons, was known to occupy a certain nest.

Mr. Gardiner does not confirm current statements to the effect that the Fish Hawks repair their nests in the fall; but in the spring there is much activity in nest-building, even by birds whose homes are apparently already habitable. The birds gather sticks from the ground and they also break them from the trees by flying at or dropping on them and grasping them with their talons. Eel grass is a favorite nest-lining and the birds often fly about with four or five feet of this grass streaming out behind like a long tail. I have never been on the island early enough in the season to observe the mating habits of the Fish Hawks, but additions to the nest are sometimes made after the eggs are laid, and birds may be seen with nest-material in June.

The variation in the character of the nesting sites of Fish Hawks on Gardiner's Island, effectively illustrates how, under certain conditions, a bird may depart from the habit of its kind, without paying the penalty which so often befalls animals with but partially developed instincts.

It is the normal habit of the Fish Hawk to nest in trees, but on Gardiner's Island one finds these birds building their homes not only in trees but actually on the ground. I do not

believe that they deliberately select such a position. Rather it seems to me, these ground-dwelling birds, while inheriting the nest building instincts of their species, are not instinctively impelled to adopt a site which has proven to be the most desirable for Fish Hawks. On the mainland, such variability from the standard would have placed the bird, its egg or its young within the reach of predaceous mammals, and it doubtless would not have succeeded in rearing its family. But in an environment where bird enemies are happily absent, the ground-building birds are as safe as those nesting in the tree-tops. Indeed, the ground-builders are in less danger than the birds which build true to type, since the trees to which, year after year, the birds come, may fall, with consequent disaster to the nest.

About ten pairs of Fish Hawks nest upon the ground, and these ground nests are always placed on the beach. Possibly the abundance of drift-wood may induce the birds to select this situation.

Several pairs of the beach-nesting birds have not only failed to inherit the tree-nesting habit but evidently have the nest-building instinct itself but slightly developed, their eggs being laid on the ground with scarce a pretense of nest. In most cases, however, the beach nests are large structures containing two or three cartloads of sticks, their size being dependent on their age, and the success with which they weather winter winds and waves. I do not observe that the number of beach nests has apparently increased since my first visit to the island in 1900, from which we may infer that the ground-nesting habit is not hereditary.

As an intermediate site between ground and tree, some Fish Hawks nest on large boulders either off-shore, when the birds have an island of their own, or inland on the rolling plains. One pair of birds had nested for many years on the roof of a small " yoke-house " standing in a field which, when I first saw it on May 30, 1900, was green with young rye. The house itself offered the only available concealment

The Nest on the Yoke-house

from which the bird might be photographed on its home. A camera was therefore erected some forty feet away, and a rubber tubing, attached to a shutter, led to my hiding place in the basement of the Fish Hawk's dwelling. It required close attention to detect the sound of the bird's foot-fall on the floor above, but when assured of its return, I could stand boldly in the doorway and, with the aid of a bicycle pump, make an exposure at my leisure.

The yoke-house has now succumbed to the weight of years and nest, but a new Fish Hawk home which has been erected in the nearest tree, is doubtless occupied by the yoke-house birds. If this supposition be true, they evidently did not resort to a roof because they lacked the ability to build in trees.

"A new nest on the ruins of the old one"

That the normal nesting-site of Fish Hawks is arboreal, is evidenced by the fact that fully ninety-five per cent. of the Gardiner's Island birds resort to trees ; but even with this restriction there is wide variation in the situation selected. Some birds nest in the heart of the forest, in the great oaks; others at its border, in the sour gums ; many choose the wild cherry trees, while a number have astonishing success in saddling their bulky platforms on the small red cedars, where they dwarf the tree into a mere supporting post.

The attachment of Fish Hawks for their home has often been commented on and there are many illustrations of it on Gardiner's Island. The nests built in cedars, in time break the tree, when the birds build a new nest on the ruins of the old one. In one instance, a tall tree, standing alone in a field, had held a Fish Hawk's nest for as many years as one could remember. During a storm it fell and the nest was scattered over the ground. The birds then attempted to build a new nest on the nearly horizontal trunk of the tree, at its junction with the stump, to which it was still slightly attached; but as fast as the sticks were brought they fell to the ground a few feet below, where a pile of them bore testimony to the birds' failure to comprehend the new conditions by which they were confronted.

A Grackle's Nest in the Side of a Fish Hawk's Nest

Eggs are not laid until seven or eight weeks after the birds' arrival from the south; a delay which, in view of the abundant food supply, it is difficult to explain. The period of incubation is said to be four weeks, June 2 being the earliest date on which I have found young.

The young are in the nest about six weeks. They are under the immediate care of the female, who is almost constantly with them while the male occupies a perch near by. While both birds whistle shrilly when one is near the nest, it is exceptional for them to make any show of defending their young by actual attack. I have never been threatened by the beach-nesting birds, but one, which occupied a tree, dived at me repeatedly when I climbed to the nest, coming uncomfortably near at each swoop.

The young are reared on the restricted diet of their parents and, as far as my observations go, the fish is captured and brought to the nest by the male, often after he has satisfied his own appetite by eating part of it. Incidentally it may be remarked that Gardiner's Island birds secure most of their fish from the numerous fish traps which, during the summer, are set about the island. They sit patiently on one of the poles to which the net is attached, until oppor-

Feeding the Young

tunity offers, when they jump down to the water for their prey ; a far less interesting method of feeding than the thrilling plunge from the air.

The young are fed at long intervals, possibly not more than twice during the day. On each occasion, however, the feeding process continues for some time. Tearing a small piece from the fish, the female usually turning her head on one side, offers it to her young, who quietly, one at a time, pick it from her bill.

Young Fish Hawks are models in behavior. Their obedience is instant and enduring. At the complaining alarm

whistle of the parent, they squat flat in the nest and hold their position, possibly for hours, until the old bird is reassured and permits them to raise their heads, when they are often surprisingly alert and active. Unlike young Terns, Gulls or Skimmers, they make no move when touched, doubtless because they have no means of escape. They therefore not only look but act like dead birds. One can turn them on their backs or place them in any position, putty-like they will remain, their only movement being a rare wink of the

"Three apparently adult Fish Hawks . . . within a foot of my face"

half-closed but staring yellow-brown eye. Young which are about to fly, however, especially if they be in a tree nest, will sometimes abandon the crouching position for one of defense. I recall with amusement my surprise when, on climbing to a nest which, from below, appeared to be empty, three apparently adult Fish Hawks, in menacing pose, suddenly materialized within a foot of my face.

The beach nests are exceptionally well situated for the purpose of bird photography, and these nests have furn-

ished the subjects for studies, to make which has been the main object of my visits to Gardiner's Island. These were conducted from my umbrella blind, without which it would have been difficult to gain an insight into the home-life of the birds. Both nests and blind were conspicuous objects on the beach and, as in many other instances, I found it important to have a co-operator whose departure, after I had entered the blind, apparently reassured the owners of the

Adult Female Fish Hawk and Newly Hatched Young

nest, within thirty feet of which the blind was usually placed. To enter the blind alone is to invest it with your personality, and the bird will not return to its nest until the impression created by your presence has become dimmed. At the best the blind itself is regarded with much suspicion and, although the bird may return to her nest before your

Fish Hawk Approaching Nest

The Pause Before Alighting

Fish Hawk Alighting on Nest

Leaving the Nest

companion is two hundred yards away, she regards the blind intently, peering, with a sinuous motion of the neck as though her gaze would penetrate the cloth itself. Some birds are satisfied more easily than others, and after half an hour accept the blind without further question. Others keep it under close surveillance for two hours and, during this time, the slightest sound or movement of the cloth is greeted with the complaining alarm whistle, which, if the cause of alarm be continued, arises to a shrill crescendo.

Fish Hawks About Two Weeks Old

In studying the life of one nest figured, the blind was entered at eleven o'clock, when the male was seen flying about with a bit of fish which he was evidently about to bring to the nest. The female returned to the nest within ten minutes after my companion left me, but it was not until 12.50, that she ceased to regard the blind with uneasiness. During this time, the male flew about rapidly, with the bit of

fish still grasped in his left foot, or perched on the ground a hundred yards away. At 12.50, the female dropped all caution, and the previously often repeated alarm note was replaced by a wholly different call, a high, rapidly uttered *tweet-tweet-tweet,* which proved to be a food-call to the male. At one o'clock, in response to it he came to the nest, but the proximity of the blind frightened him and he took wing again almost as he alighted, and returned to his perch on the beach. Again the female uttered her food-call and the young were now permitted to move about the nest. Finally the male came again but, as before, his fears overcame him and he departed quickly, taking the fish with him. Three times this performance was repeated; on the fourth, the female, losing patience or prompted by hunger, attempted to take the fish from his foot with her bill, when, as the male arose, the fish was pulled from his grasp and dropped over the edge of the nest to the sand at its base. This was a catastrophe with which neither bird was prepared to cope. The male made no move to get another fish but went back to his perch in the meadow. The female repeated her food-call more loudly and the young apparently asked for food, uttering a twittering peep; but experience had not fitted her to deal with this chain of events and the fish at the foot of the nest was left where it fell.

Owing to the stable conditions of their habitat, as well as to the regularity of their habits, the Fish Hawks of Gardiner's Island offer an exceptionally valuable subject for continuous observation. The present contribution merely suggests the opportunities which await the ornithologist who, beginning by a survey of the island in order to plot on a map the exact location of each nest, will devote several weeks during the nesting, for a period of years, to an intimate study of certain nests and a general supervision of them all.

My visits to Gardiner's Island have been made chiefly during the summer (May 29-June 2, 1900 ; July 2-7, 1901 ;

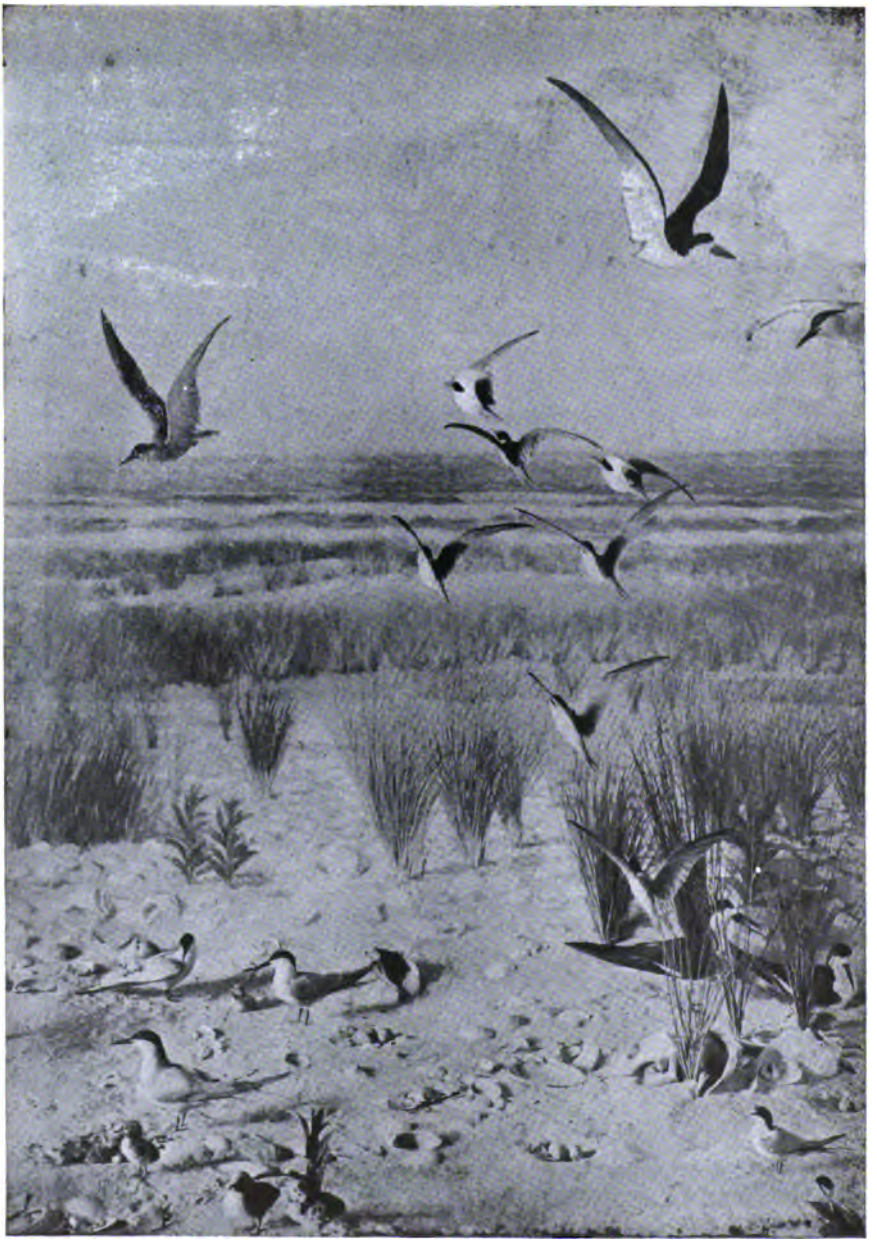
June 16-21, 1908); but in November, 1907 (23-25), I went to the island with George E. Lodge, to have a glimpse of its winter bird-life, and an interesting one it was. It stormed heavily and continuously during our stay, but, nevertheless, we saw fifty species of birds (or only nineteen less than the total for my three summer trips), and as a matter of interest as well as of record, I append a list of them with an estimate of the number of individuals of each species.

If the nesting of Black Ducks, Bartramian Sandpipers, Piping Plover, and other rare species, is a tribute to the protective powers of the island during the summer, the presence of fifteen species of wild Ducks in November is a no less impressive evidence of its preserving influences at that season. With no small satisfaction, we saw, in the same pond, and almost at a glance, Hooded Mergansers, Pintails, Redheads, Canvasbacks, Buffleheads, and Ruddy Ducks; but as a matter of fact, the most interesting experience of our visit was supplied by the commonest bird on the island — the Crow. Crows are abundant on the island throughout the day, foraging in the old corn-fields and along the beaches; but late in the afternoon, birds from Long Island begin to return to the island, to their roost in "Bostwick's Woods." The rolling plains at the edge of woods where we were hiding was black with Crows, acres of them. Birds were constantly arriving and the black area growing larger and denser. Occasionally birds on the ground quarreled, while others chased one another rapidly; but on the whole, there was surprisingly little noise or movement. The birds were waiting, and waiting quietly. When it was too dark to distinguish birds on the ground one hundred yards distant, the flight to the roost was begun. There was no noise, no confusion; the Crows did not rise in a body but gradually, curling like smoke in a long black stream, they entered the woods behind us and disappeared in the gloom. It was an impressive sight, and rendered doubly so by the absolute quiet with which the evolution was performed.

LIST OF BIRDS OBSERVED ON GARDINER'S ISLAND, NOV. 23-25, 1907

Horned Grebe, 25
Loon, 10
Red-throated Loon, 1
Kittiwake, 1
Black-backed Gull, 20
Herring Gull, 300
Cormorant, sp., 2
Red-breasted Merganser, 6
Hooded Merganser, 6
Mallard, 4
Black Duck, 500
Baldpate, 100
Pintail, 6
Redhead, 6
Canvasback, 6
Golden-eye, 20
Buffle-head, 100
Old Squaw, 200
American Scoter, 2
White-winged Scoter, 500
Surf Scoter, 200
Ruddy Duck, 150
Great Blue Heron, 1
Bob-White, 60
Pheasant, 12
Marsh Hawk, 6
Sharp-shinned Hawk, 1
Red-tail, 3
American Rough-leg, 12
Downy Woodpecker, 1
Flicker, 15
Horned Lark, 30
American Crow, 50,000
Purple Grackle, 2
Meadowlark, 30
Goldfinch, 6
Pine Finch, 1
Snowflake, 25
Ipswich Sparrow, 1
Tree Sparrow, 10
Junco, 20
Song Sparrow, 12
Fox Sparrow, 1
Myrtle Warbler, 50
Brown Creeper, 1
Carolina Wren, 12
Winter Wren, 1
White-breasted Nuthatch, 3
Chickadee, 20
Robin, 2

Parent and Young



A Section of the Habitat Group Representing the Summer Bird-life of Cobb's Island

The Least Terns here shown were once abundant on the island but have been exterminated by millinery collectors. Background painted by Walter Cox; birds mounted by H. C. Denslow.

COBB'S ISLAND

The Atlantic coast, from New Jersey to North Carolina, is bordered by an outlying chain of islets. Many of them are mere sand bars, more or less grown with coarse grasses, and, on their western sides, fringed by marshes which reach out into the bays separating them from the mainland.

Useless for agricultural purposes, these islands have a high commercial value only when they have become the sites of summer resorts; but when they have not suffered from an irruption of hotels and cottages they are, as a rule, tenanted only by an occasional fisherman or the crews of life-saving stations, whose presence does not materially alter their primeval conditions.

Lacking the natural foes of birds which exist on the mainland, these barren islets make ideal breeding-grounds for birds, which find on them the isolation their peculiar nesting habits require, while the surrounding waters furnish them an abundant supply of food.

In all this chain of bird homes, probably none has been better known to ornithologists than Cobb's Island, on the Virginia coast, north of Cape Charles. Seven miles long, it has been occupied by man only at the extreme southern end; a small sportsman's club-house and a life-saving station being now its only dwellings.

Twenty years ago, Willet, and Least Terns, in large numbers, and Royal Terns bred on Cobb's Island, but to-day the former is rare while the two latter are unknown, and there are left as breeding birds, Common, Forster's, and Gull-billed Terns, Laughing Gulls, Skimmers, Oyster-catchers, Wilson's Plovers, Clapper Rails and Seaside Finches. Willet have disappeared before spring shooting, in what was actually their nesting season. The Least Terns fell vic-

tims to the milliners, who greatly decreased the other species of Terns nesting on the island. The former captain of the life-saving station told me of 1,400 Least Terns being killed in one day; while the captain of the station and Mr. E. B. Cobb, owner of the island, informed me that when Terns were first killed for millinery purposes they, with another man, killed 2,800 birds in three days on and near Cobb's Island. The birds were packed in cracked ice and shipped to New York for skinning; ten cents being paid for each one.

In July, 1902 (23-25), I visited Cobb's Island to secure data, photographs and specimens with which to represent its summer bird-life in a Habitat Group. At the same time, it was proposed to study the Black Skimmer. Marvellously graceful in the air, the Skimmer is so conspicuously ugly when at rest, that not even the milliners consider it available for alleged hat decoration; consequently it was spared while its more beautiful neighbors, the Terns, were slaughtered, and it is numerous in favorable localities on the coast from Virginia to Texas.

But in spite of the Skimmer's abundance, its conservatism in the matter of habitat removes it from the field of observation of most ornithologists, and, at the time of which I write, accounts of its habits could be found only in the works of Wilson and Audubon. Neither of these remarkably keen and sympathetic students of bird-life appears, however, to have had an extended experience with the Skimmer during the nesting season. Both state, for instance, that it lays only three eggs ; whereas the full complement is four; and, Wilson writes that the " female sits on them only during the night and in wet and stormy weather." As I desired especially to secure photographs of the sitting bird, this question of the day or night incubation was of importance. I made inquiry, therefore, of ornithologists who had been among Skimmers, but not one had ever seen a Skimmer on its nest. Hence the life history of the Skimmer appeared to be an unusually attractive subject for investigation. Unique in

Skimmers Over the Beach

structure, he was known to be correspondingly unique in feeding habit; while there was something pleasantly mysterious in the birds' supposed habit of coming home only after dark.

Skimmers arrive on the Virginia coast early in May, and begin to lay about June 15; but their nests are so persistently robbed by fishermen that few young are hatched before July 20. The latter part of this month or early August is, therefore, the best season in which to study the domestic economy of the Skimmer household.

It is a memorable moment in the life of the naturalist when the animal of books or museums, or even zoological gardens, is first seen by him, a wild, free creature in its haunts; and when the animal is as singularly formed as the Skimmer, one's desire is intensified by a curiosity to see it use its peculiar and characteristic organs. Imagine, then, the joy of an ornithologist who, for the first time, finds himself in a breeding colony of thousands of Skimmers, where the air is filled with a yelping mob of birds whose eggs and young are so numerous on the broad shell-strewn beach, that one cannot walk without danger of stepping on them.

It was not difficult to find a spot in which to begin a study of the birds. Some minutes before reaching the boundary of the territory they inhabited, a band of birds arose in the air and, with more or less extended front, flew toward me only to swing to one side, wheel and fly back again; all uttering a trumpet-like note which is effectively emphasized by violent bill action, the bright red and black mandibles opening widely with each note. When the nests were reached, the uproar increased and with it the excitement and boldness of the particular birds near whose eggs or nests I chanced to be standing. Starting a hundred or more feet away, one after the other charged toward me with such speed and apparent fearlessness, that one could well be pardoned an involuntary dodge ere the birds, when only a few feet away, swerved and passed over one's head.

Wheeling

Charging

Passing

The Skimmer in Flight

The nests are hollows in the sand, often only a few feet apart and with absolutely no lining, the Skimmer's bill being evidently not adapted to gathering nesting material or constructing a nest. The four creamy white eggs are conspicuously marked with black, and are by no means difficult to see; but the downy young so closely harmonize with their surroundings in color, that they are far less easy to discover

Skimmers on Their Nests
Note their conspicuousness, even at a distance

than the young of any beach-nesting bird with which I am familiar. Their partial invisibility, it should be observed, is not due to their resemblance in form to their surroundings, or to the necessity of distinguishing them from pebbles or shells, as is often the case with young Terns. It is purely a matter of color and disposition of color which makes them fade into the bare sand about them. Like most young birds, they instinctively know that safety lies only in unquestioning obedience to the parental command, which warns them of threatening danger, and bids them squat close to the sand with neck stretched out and eyes half closed. I could scarcely believe, for a moment, that the first one seen in this attitude was a living bird, but behold ! when

I stooped to pick him up, at the touch of my finger tips, he evaded my grasp and scudded over the beach so fast I scarce could catch him.

It was easier to discover the nests of the Skimmers than a vantage point from which one might study the habits of their owners. As yet I had not learned whether they incubated by day or night, and this could be done only by con-

Skimmer on Nest

Note the young bird in the shade of the plant

cealing myself and waiting until peace and quiet in Skimmerland came, with the assurance that their enemy had departed. The blind was therefore erected in a depression on a sand dune within one hundred and fifty feet of twenty or more nests. The whole affair was then covered with beach grass, and into it I crept.

For a time, the birds threatened this unfamiliar object, darting at it with loud screams ; but within one hour and a half, it ceased to annoy them and, to my great satisfaction, bird after bird returned to its nest, some alighting directly on the little hollow in the sand, others dropping near-by and

with waddling step, walking to the nest and settling themselves on their eggs or newly hatched young with a low, brooding, *churring* note reserved for this occasion, and evidently indicative of extreme contentment. This answered the question of day or night incubation ; but it would be well to illustrate this fact in the bird's history, and cameras bound about with grasses were placed near several nests, a thread run from them to the blind, and numerous pictures were thus made of the Skimmer at home.

The Young Skimmer

"Sand rendered in feathers"

I passed two days in my blind, enjoying to the full the isolation of the Skimmer's retreat, and the privilege of seeing, unseen, a wild creature in its haunts. Within this short time, some additions were made to our knowledge of the Skimmer's habits. Thus I learned that the hollow where the eggs are laid is not a chance depression, but is made by the bird—the female, so far as was observed—which, squatting close, turns round and round, actually boring out a shallow cavity in the easily yielding sand.

Apparently only the female incubates, but the much larger male often comes and stands by her side while she sits on the eggs, a pleasant picture in bird life suggestive of domestic harmony. In all the pictures made of the sitting bird from the front, one or two of the eggs can be seen through the breast feathers, as though the bird had a larger "clutch" than she could cover. The period of incubation I had no means of determining, but certain it is that once the chick announces his coming by a chicken-like *peep,* the trans-

Three Young Skimmers
"Squat close to the sand with neck stretched out"

formation of a pipped egg into a bright-eyed downy Skimmer, endowed with all the instincts of its kind, is a matter of only two and one-half or three hours.

As soon as the nestling emerges from the egg, the shell is taken by the parent, and, so far as was observed, carried out of sight; a singular custom, common to most birds. The habit is doubtless of importance to a tree-nesting bird, where the egg-shell below might advertise the young bird above; but why, with a beach-nesting species an egg-shell should be considered more conspicuous than an egg it is

Gull-billed Tern on Nest

hard to say; but there can be no doubt that once it has released its contents, it must be disposed of as quickly as possible.

The chicks seem to appear on successive days, and to leave the nest when a day or two old. They are fed on small fish and doubtless other forms of aquatic life, which, at first, may be partially digested by the parent bird. Whether or not each parent finds its own chicks when the beach becomes alive with hungry youngsters, cannot be confirmed definitely, though there is evidence to show not only that the old birds recognize their offspring, but that the latter know their parents.

So singular in form is the bill of the adult Skimmer, that Buffon described it as an " awkward and defective instrument"; a somewhat surprising conclusion to proceed from so learned a naturalist, and one which Wilson pronounced an "impiety." With the lower mandible averaging half an inch longer than the upper, and with both so thin and flexible

that they can be bent as readily as a table knife, one might be pardoned for believing the Skimmer's bill a deformity; but the belief is quickly dispelled when once the bird is seen feeding. Flying low, with bill opened wide, the lower mandible cuts the water like a knife edge, as the birds actually skim the surface for fish and small forms of aquatic life.

Laughing Gulls on Their Nests in the Marsh

In the newly hatched bird, it is of exceeding interest to observe that the mandibles are of virtually equal length, and the lower mandible does not become pronouncedly longer than the upper until the bird takes wing. This may be considered as evidence that this highly specialized character has been developed late in the history of the species; or the development of the bill may be a correlation in growth which defers the perfection of an organ until it can be successfully employed. Certainly without the power of flight, a Skimmer could not "skim." Until, therefore, the bird can fly, it supplements the supply of food brought by the parents by picking up a living along the beach.

Skimmers were frequently seen feeding during the day, particularly along the meeting line of sand and sea, where

they gleaned from the burden of the waves; but it was at dusk that they became really active. Then they followed the course of the streams winding through the marsh, now skimming for a short distance, again rising slightly and uttering a sharp *yap, yap,* like a pack of hounds on the trail.

In addition to the Skimmers, the breeding birds on Cobb's Island at the time of my visit, were several hundred

Laughing Gull on Nest

Common Terns, a small number of Forster's Terns, about eight pairs of Gull-billed Terns, a pair each of Oyster-catchers, Willet, and Wilson's Plovers, several hundred Laughing Gulls, and many Clapper Rail. The young Rails furnished the principal fare of several cats which Mr. Cobb had brought to the island to kill the meadow mice which destroyed the sails and rigging of his boats.

Two pairs of Gull-billed Terns were nesting in the Skimmer colony to which I devoted my attention, where, aside from the difference in their eggs, the Terns' nests were at

once distinguishable from the Skimmers' by the large number of shells which had obviously been arranged about them. The Terns' light, thin, somewhat reedy *tee-tee-tee,* which sometimes suggested a weak-voiced katy-did, was a readily identifiable note.

From my blind among the Skimmers, I could look out over the marsh where the Laughing Gulls nested, and in the morning the breasts of the birds facing the east looked like great white flowers with which the marsh was dotted. No attempt was made to study these birds, but they were photographed without difficulty by erecting bundles of grass on tripods near the nests, one evening, and replacing them with grass-covered cameras, the following morning. Exposures were made with a thread run to the blind, (which was made to resemble a musk-rat's nest), a hundred and fifty feet away. Some nests contained newly hatched birds, and comparison of their black and umber down, so like, in general tone the color of their nest, with the gray down of the young Skimmer, which might be described as sand rendered in feathers, shows how perfectly each helpless chick matches its own background.

Newly Hatched Laughing Gull

PART III.

FLORIDA BIRD-LIFE

PELICAN ISLAND

THE FLORIDA GREAT BLUE HERON
AND THE WATER TURKEY

THE AMERICAN EGRET

CUTHBERT ROOKERY

Young American Egrets

"Alert and eager expectancy" (p. 134.)

FLORIDA BIRD-LIFE

INTRODUCTORY

From the time of Catesby, in 1730, Florida has been the Mecca of American ornithologists. Bartram, Ord, Audubon, Bryant, Allen, Merriam, Maynard, Scott, Brewster, Ridgway and scores of other bird students have been attracted by the bird-life of a region, which, not only far exceeded in interest that of any other part of our country, but in some respects was possibly not equalled by that of any other part of the world.

As compared with that of other states, the bird-life of Florida is distinguished first, by the occurrence of certain West Indian species; second, by the evolution of certain strongly marked geographical races or nascent species; third, by the continued existence there of species which have become rare or extinct in other parts of North America; fourth, by the presence of several western birds not found elsewhere on the Atlantic Coast, and fifth, by the great development of those communal gatherings of birds in what are generally termed "rookeries."

As a result of its geographical position, fifteen West Indian or tropical species have been recorded from Florida, only one of which is found regularly beyond the southern part of the state; most of them, in fact, being summer visitants to the Keys. Of the number named three have been found in Florida but once or twice. On the whole, therefore, the West Indian element in Florida's bird-life is smaller than the proximity of the state to certain West Indian islands might lead one to expect. The Biminis in the Bahamas, for example, are only forty miles from Cape Florida; nevertheless such characteristic Bahama birds as the Grassquits

(*Euethcia*), Honey Creeper (*Certhiola*), Ani (*Crotophaga*), are unknown or accidental in Florida, though they are common on the Biminis as well as Great Bahama fifty miles farther north.

A combination of climatic conditions and peninsular isolation acting, for the most part, on permanently resident species, has resulted in the development, in Florida, of some twenty-three more or less well marked geographical races or species of birds in the making. Some of these extend northward, up the Lower Austral Coast strip to South Carolina and westward to Louisiana, while others are confined to the southern half of the state. As a rule, they are smaller in size and darker in color than their more northern representatives.

Florida, however, is not only making new species but it has preserved old ones. The Sandhill Crane, now extinct as a breeding bird in most of the northern states where it was formerly common, is still abundant in certain parts of south central Florida; the Ivory-billed Woodpecker is now found, outside of Florida, only in Louisiana; the Carolina Paroquet, once numerous in all the eastern states south of Virginia, is now found only in Florida, and the last United States individuals of the Snowy Egret, Reddish Egret, and Roseate Spoonbill will doubtless be found in Florida.

Probably it is to this state's preserving influences, acting over a much longer period, that we may attribute the presence there of birds with such close western affiliations as the Burrowing Owl and Florida Jay; both of which so closely resemble their representatives in our western states as to be considered essentially similar to them. Probably the wide area intervening between the range of the Florida and western species was, where favorable, at one time occupied by both Jays and Owls; but whatever the reason for their extinction there, whether the cold of a Glacial Period or some more recent agent, it apparently was not active in Florida, which, beyond question, must have been the retreat for

many species which were forced southward during the Ice Age. Perhaps to the influence of this profound climatic change we may attribute the presence of the Great Auk in Florida, as attested by the remains of this boreal bird in a shell-mound near Ormond.

Interesting as are the various factors thus far mentioned, their results are appreciated mainly by the bird student, and it is to the development of its "rookeries" that the bird-life of Florida owes its most distinguishing feature and greatest charm.

In our southern states, "rookery" (pronounced *rukery*) is the term uniformly applied to nesting colonies of birds. Such gatherings may be made of from one to several species, but, because of their commercial importance, one more frequently hears of Heron rookeries; particularly such as are tenanted by "Long" and "Short Whites," as the aigrette-bearing Herons are called. There may, however, be Ibis, Cormorant, Water Turkey or Pelican rookeries. From rookery we have in common use, among plumers, at least, the verb to *rook,* which, in its past tense, becomes *rooked* or even *rooketed,* while the participle is *rookin'*.

In addition to its southern position, Florida's numberless lakes, extensive bayous, marshes, and shallow shores abounding in food; its cypress swamps, "willow-heads," and mangroves, suitable for nesting, have made it an ideal home for those aquatic birds which nest in colonies, in trees or bushes growing, preferably, in water. Of these birds, Herons, Egrets, Ibises, Spoonbills, and others, the state once possessed a marvelous store, but be it said to Florida's everlasting disgrace that, until the honorable industry of shooting birds at their nests became no longer profitable, she raised no hand to save herself from being despoiled of this rich heritage. Even then, the passage of laws was secured only through influence from without. The laws, however, were not observed, and all efforts to secure conviction under them failed.

It is small satisfaction to the bird-lover to know that Florida herself is the greatest sufferer from the niggardly short-sightedness which allowed the agents of northern milliners to loot her of her treasures. Her loss was their profit. The few thousands paid the plumers is a pitiful sum when one considers the real value of what has been irretrievably lost.

This was not a case of civilization's advance, before which, of necessity, certain forms of life must disappear. The marshes and swamps, river, lake and sea shore, once animated by snowy plumaged Herons, and Ibises, and by Roseate Spoonbills, still exist and will long continue to exist as they were when the birds glorified them.

This is rather a case where the *lack* of civilization may be held accountable. If the laws were respected, these birds might be just as abundant in Florida to-day as they ever were, when the marvel of this nature's aviary would form an attraction such as the state can never hope to possess again.

I began my study of Florida birds in 1886 and have continued it at intervals to the present time. In another connection, I hope to present the results of researches which have covered the greater part of the peninsular; here are given only certain special studies, made mainly while gathering material for the groups of American birds previously mentioned.

PELICAN ISLAND

HISTORY OF THE ISLAND

That long, narrow bay or lagoon on the east coast of Florida known as the Indian River, contains hundreds of mangrove-covered islets all singularly alike in character, but as far back as the record goes one of them, possessing not more than three acres, has been the principal nesting resort of the Brown Pelicans of this region and, at the present time, these birds are not known to breed at any other place on the Atlantic Coast of Florida. In "Bird Studies with a Camera," (pp. 191-214), I have given the results of observations made on Pelican Island in March, 1898. When necessary, however, for the sake of completeness, some of this material is incorporated with the results of the later studies contained in this chapter.

In 1858, Dr. Henry Bryant, whose enterprise in ornithological exploration deserves far higher recognition than it has commonly received, wrote (Proc. Bost. Soc. Nat. Hist., VII, 1859, p. 19):

That "the most extensive breeding place" he visited in Florida "was on a small island, called Pelican Island, about twenty miles north of Fort Capron. The nests here were placed on the tops of mangrove-trees, which were about the size and shape of large apple-trees. Breeding in company with the Pelicans were thousands of Herons, Peale's Egret, the Rufous Egret and Little White Egret, with a few pairs of the Great Blue Heron, and Roseate Spoonbills; and immense numbers of Man-of-War Birds and White Ibises were congregated upon the island. * * *."

Of the birds mentioned by Dr. Bryant, the Pelican alone remains; while of the trees which covered the island at the time of his visit, not a single one is living. In 1898, when I

first saw Pelican Island, there were still enough mangroves to afford many of the birds the arboreal type of nesting site characteristic of their species; but the birds which could not secure a building lot in a tree were forced to place their house upon the ground.

This transition period has now passed. The mangroves, here near the northern limit of their range, have suffered by the "freezes" of recent Florida winters, while their excessive use by the birds—which in some instances placed as many as seven nests in a single tree—has prevented their recovering from the effects of low temperature.

From a mound of glossy green foliage Pelican Island, within a period of fifty years, has thus become a treeless mud-flat, largely grass-grown, but still it is beloved by the Pelicans, the impelling motive which prompts them to return to this particular spot being evidently stronger than that which induced them to nest in trees.

I know of only two occasions when the Pelicans failed to establish their yearly nursery on the islet of their choice. Once they were driven away by that curse of Florida, irresponsible, gun-bearing tourists. Landing on the island they shot the inhabitants in large numbers and left them to rot in the mud. The survivors retreated but established quarters on the nearest islet.

The second time the Pelicans deserted their ancestral home, they were driven away not by enemies but by friends. Prior to the passage of the present admirable bird-protective law in Florida, the Pelicans were at the mercy of every man with a gun. A demand from milliners arose for their wing-quills, and it was feared that at any time Pelican Island might be attacked. An effort was made to buy it from the government, but the red-tape knots of the Land Office defied untying until, on presentation of the case to President Roosevelt, he, with characteristic directness, severed them by declaring Pelican Island a Federal Reserve. The National Association of Audubon Societies, co-operating

with the government, immediately appointed a warden who was empowered to prevent trespass, and erected on the island a large sign proclaiming its population to be wards of the government.

The future safety of the Pelicans now seemed assured, but on visiting the island in April, 1904, I found to my surprise and disgust, that with a uniformity of action which left no doubt as to their attitude, the birds had expressed their disapproval of the whole arrangement by failing to return to the island. For the first time in its history not a nest was made or an egg laid upon it, but the two nearest islands contained over 700 nests.

In November, 1904, the beginning of the nesting season, when the Pelican clans began to gather, it was evident that the great sign announcing Federal possession of the home of their forefathers appeared to cause them much uneasiness, whereupon the warden, who had long suspected the root of the trouble, removed the offending boards, and the birds at once returned to their heritage, built their homes, and reared their families, as the accompanying pictures, made during the season in question abundantly prove.

Consequently, we may infer from this incident either that the Pelican can read and has strong political prejudices which prompt it to refuse favors from the administration which has preserved its home, or that it lacks sufficient discrimination to realize that a board painted white with black marks and held upright by two posts is perfectly harmless.

However this may be, the fact remains that, to the great satisfaction of their well-wishers, the birds have entered no objection to the small signs which have replaced the large one, but return to the island in increasing numbers each year under the guardianship of the government.

Pelican Island is the most interesting bird colony it has been my privilege to visit. This is due in part to the habits of the birds, in part to the conditions which usually create

great variability in the time of laying and development of the young, so that during March and April one may see at a glance every phase of the birds' home-life from the egg to the bird on the wing, and in part to the growing tameness of the birds, which by the exercise of a little caution, one may observe under terms of exceptional intimacy.

But this bird colony is not only the most interesting in my experience, it is also the most accessible. Here one has to encounter no dangers of sea or cliff, no flood and desolation of Bahaman "swash," no mosquitoes and moccasins of noisome marsh. On the contrary a trip to Pelican Island is as delightful an outing as one may have in Florida. A "Pullman" brings one to any of the scores of resorts on the east coast water ways. One has then only to secure the needed permit from Warden Kroegel at Sebastian, when all the rest is plain sailing or motoring, as the case may be. Thanks, therefore, to the efforts of bird students, seconded by a sympathetic administration, Pelican Island should long continue to delight visiting nature-lovers as well as to supply our south Atlantic coast with a singularly interesting form of life.

THE RETURN OF THE BIRDS

The records of Warden Kroegel show that, as a rule, Pelicans, in flocks of from 500 to 1,000 arrive, apparently at night, in the vicinity of Pelican Island about November 1. At first they stay on the river, their numbers rapidly increasing, and during this time they sail for hours over the island, possibly engaged in mating evolutions. The clans having gathered, at the end of the week the birds in a body take to the island. Nest-building is begun at once, and the first eggs are laid by December 1.

The season of 1907-08 was exceptional. The birds arrived earlier than usual; and the first eggs were laid November 5. Warden Kroegel estimates that when they first came there were fully 7,000 birds; but this number soon decreased

Pelican Island in March, 1905
The blind from which these studies were made is directly below the three

and only 1,500 nests were built. This would imply a breeding colony of only 3,000 birds, but what became of the remaining 4,000 birds is a mystery.

Possibly this variation in nesting date was occasioned by the exceptional climatic conditions which prevailed in Florida during the preceding year, when for a period of seven months no rain fell.

Whatever may be the cause or causes for this variability in the date of the Pelicans' migration—for it is true migration—it is evident that they act upon all the birds uniformly.

The island colony is not formed gradually, virtually all the birds come at once, moved by a common impulse. What is it? It is not a question of food, for the birds rarely feed near their nesting place. It is not a question of climate, for they do not go far enough from their breeding resort to experience climatic change when returning to it. The immediate cause of the journey is doubtless physiological and the prompting comes from within. With birds the season of reproduction is periodic, and with migratory species, whether the journey be to a near-by island or to another zone, the return to the breeding ground is only one phenomenon in a cycle of events which includes, in regular order, migration, courtship, egg-laying, incubation, the care of the young, the molt, and the retreat to winter quarters.

Newly awakening sexual activities now stimulate the flocking impulse and the birds doubtless gather in small companies later to be merged in one great flock as they are brought together by the instinct which leads them to the place of their birth. The actual return to the island is apparently not made until the last comers have arrived, and we have here a partial parallel to the roosting of Crows which, assembling in some near-by field, do not enter the roost until apparently the last bird has come, when they arise to seek their resting-places for the night.

It is a remarkable fact that while the Pelicans of the east coast of Florida begin to lay in November, those of the west

coast do not nest until April, the earliest recorded date for egg-laying being April 21. There is occasionally a supplementary breeding season on Pelican Island; from one hundred to three hundred birds sometimes laying late in April. Whether this represents a first or second brood is unknown, but it is apparently comparable to the normal west coast breeding season.

That there should be six months difference in the breeding time of birds which pass their year under essentially similar conditions, is as surprising as though the mangroves of eastern Florida were to blossom half a year earlier than those of the west coast. With the information now at our command the case appears to be inexplicable.

Adult Pelicans in Breeding (brown neck) and Non-breeding (white neck) Plumage

As late at least as April 1 one rarely if ever sees a Brown Pelican on the gulf coast of Florida with the full brown hind neck of the breeding plumage; while on the Atlantic Coast I have seen but one adult bird with the white hind neck of the non-breeding plumage. Birds from the two coasts possibly therefore do not intermingle and the difference in their nesting seasons which this difference in plumage correlates, may be a result of long continued isolation. The April nesting of a few east coast birds may, therefore, represent the survival of a nearly obsolete habit.

THE PELICAN'S HOME-LIFE

In March, 1898, I anchored my sloop within a hundred yards of Pelican Island and for the greater part of four days and nights gave my attention to the life of the island. I returned to the island in April, 1900, using the same methods of study as before. At no time, however, were the birds unaware of my presence and it was not until a blind was employed in April, 1905, and in March, 1908, that I really entered the inner circles of Pelican society. Erected among the thickly set nests it was shortly accepted as a part of the landscape, and so far as the Pelicans were concerned, I left the island when I entered the blind. Soon the birds began to return to the nests or young they had reluctantly deserted at my approach, and in a few minutes the routine of Pelican Island was resumed; and one experienced the wholesome satisfaction and quite indescribable fascination of being closely surrounded by wild creatures, that, unaware of your existence, live their lives in an absolutely natural manner.

With a wing spread of between seven and eight feet, a Pelican is an impressive bird even at a distance; but when dozens of the broad-pinioned birds swept by me within arm's length, I realized that given the excitable, courageous nature of Terns and Gulls, the Pelicans might dispense with the services of a warden.

It is true, a bird which had placed its nest on a stump six feet from my shelter snapped its bill loudly at me when I peered at her through a slit in my blind. The young defend themselves in a similar manner until their wings will bear them, when, like their seniors, they show their faith in the valorous discretion of flight.

In February, 1905, a norther had flooded the lower portions of the island washing hundreds of eggs from their nests and forcing many birds to begin household duties again. April of that year afforded, therefore, an excellent opportunity to observe many phases of the Pelican's nest-

"Dozens of the broad-pinioned birds swept by me."

ing habits. Birds of all ages and voices, from the grunting, naked, squirming new-born chick or the screaming, downy youngster, to the silent, dignified, white-headed parents, were within a few yards of my blind. At a glance I could see most of the activities of Pelican home-life; nest building, laying, incubating, feeding and brooding young, bathing, preening, sleeping, fighting; while the great number of individuals made it possible to check one's observation repeatedly.

The early return of the birds in the fall of 1907 in connection with a favorable season, resulted in an exceptionally uniform and rapid development of their domestic affairs, giving me in March, 1908, an opportunity to study the colony at a more advanced stage than I had previously found it. The following outline of the bird's home-life is based chiefly on the observations made in 1905 and 1908 in connection with certain facts supplied by Warden Kroegel.

The Nest.—Even in the tropics birds, as a rule, do not nest until spring or early summer, when a return of the rainy season assures them of an abundance of food for their young; but the Pelican woos his mate in November, or, as we have seen, even October. Among such dumb and undemonstrative birds courtship must be a very solemn affair, but that is a subject we know very little about. Apparently, however, it is conducted to the satisfaction of both contracting parties, and with the happiest results; for never have I seen indications of domestic troubles among the indigenes of Pelicanland.

When there were still trees upon the island, the first nests built were placed in them, in response to the normal habit of the species. When the arboreal sites were taken, the remaining birds built their nests upon the ground. Now, however, there is no choice and all the birds are of necessity terrestrial.

Later observations confirm the opinion expressed in 1900 ("Bird Studies with a Camera," p. 205) but questioned in

1902 ("Bird-Lore," 1901, p. 1) regarding a variation in the character of tree and ground nests. The former are composed more largely of sticks with a lining of grasses and are, or were, often built upon a platform or frame made by laying heavier sticks from crotch to crotch. Ground nests, as a rule, contain few or no sticks but are built largely or entirely of reed grasses.

Incubating Pelicans

This nesting material is found in abundance on the island and the birds gather it, take it from old nests, or steal it from occupied nests. It is, as might be supposed, carried in the bill.

The destruction of the trees on Pelican Island has profoundly affected the conditions of Pelican life there. An arboreal nesting site was so much safer, both for eggs and young, that it is possible the change to a terrestrial site has been followed by an increase of at least fifty per cent in the mortality of the nesting season.

Pelican Island is unfortunately so low that a severe "norther" raises the water sufficiently to flood all but the sand-bar at its eastern end. Only those birds which build upon the sands are secure from the waves. In April, 1905, all the occupied nests were on the higher, eastern portion of the island and anyone visiting the island at this season might have been led to credit the birds with sufficient intelligence to select a nesting site above high-water mark. Whereas, in truth, the earlier homes of many of these same birds, built on low ground, had been inundated, and their eggs washed from the nests, were still scattered about the island, as may be seen in several of the accompanying photographs. Apparently, then, there is no conscious selection evolved by experience. Year after year, birds nest on low ground and suffer the consequences, while the higher ground colony is established by the elimination, through disaster, of the birds which do not resort to it.

Lost eggs may be and doubtless usually are replaced and it is rather through its effects on the young birds that the ground nesting site produces so high a mortality. I have never visited a colony of nesting birds containing anything like the number of dead young commonly to be seen on Pelican Island.

Under normal conditions a Pelican born in a tree-nest does not leave the tree in which its home is placed until it makes its first attempt at flight. When born on the ground it leaves its nest as soon as it can walk. The tree-born bird has therefore not only a cooler, better ventilated, cleaner home, but he is not brought into competition with his fellows before he is strong enough to care for himself. The struggle for food is severe and while the parents make every effort to feed their young, they are sometimes deceived and the young themselves are at times robbed of their food before they have an opportunity to swallow it. Furthermore, the young are ten weeks old before they can fly and during at least the first half of this period the flooding of that portion of the island on which they were born would result fatally.

Before the appointment of a warden the presence of visitors on Pelican Island proved extremely disastrous to the young of the ground nesting birds. In close huddled flocks they were driven from their nests to which doubtless some birds failed to return, while others died from over-exertion. This source of danger can now be prevented but floods cannot be so readily controlled and at intervals the Pelicans must be expected to afford fatal proof of the comparative insecurity of a ground-nesting site.

The Ceremony of Nest Relief

The Eggs.—Birds of the tropics as a rule lay a smaller number of eggs than their northern representatives; but the White Pelican of Saskatchewan and the Brown Pelican of Florida each lay three eggs. On Pelican Island the eggs are generally laid by December 1, and hatch four weeks later.

Brown Pelicans do not differ in color sexually. It is impossible therefore to determine by external appearance the sex of the sitting bird. Observation from a blind, however, reveals the fact that both sexes incubate, the change of places being usually preceded by an interesting little performance which I have called the Ceremony of Nest Relief.

As a rule the bird on the nest is not attended by its mate, who may be feeding, bathing, resting on the shore, or sailing high in the air. The returning bird alights near the nest and, with bill pointed to the zenith, advances slowly, waving its head from side to side. At the same time the sitting bird sticks its bill vertically into the nest, twitches its half-spread wings, and utters a low, husky, gasping *chuck,* the only note I have ever heard issue from the throat of an adult wild Brown Pelican. After five or six wand-like passes of its upraised head, the advancing bird pauses, when both birds, with apparent unconcern begin to preen their feathers, and a moment later the bird that has been on duty steps off the nest, and the new comer at once takes its place.

This was the "ceremony" in its full development; often it was not so complete. Doubtless it possesses some sexual significance, and observation points to the conclusion that the relieving bird is the male and that the ceremony is omitted when he gives place to his mate.

There was apparently no such regularity in this event as exists, for example, among incubating Pigeons with which each sex spends its appointed time on the nest.

The Young.—The young Pelican is distinguished chiefly by the surprising amount of noise it makes. It can be heard almost before it can be seen; as with only the tip of its bill visible it announces by a choking grunt its early release from the egg.

In "Bird Studies with a Camera" I have given some account of the growth of young Pelicans, and it may be stated here merely, that the young are livid black, naked, and blind at birth; the eyes open the second day and at the age of ten or twelve days a white down makes its appearance which in about a week more completely covers the chick. This is followed by the grayish brown plumage of flight which first appears upon the wings and is fully acquired when the bird is about ten weeks old.

The voice, at first a choking bark, passes through a rasp-

ing *k-r-r-r-ring* stage to a high piercing scream in the down-covered bird, to a dignified groan in the bird in flight plumage. The statement in "Bird Studies with a Camera" that after it has acquired the power of flight the young bird, like the adult, is virtually voiceless, is an error, later observation showing that the high scream is largely a feeding note which the fledged young utter at least as long as they receive food from the parent.

"The croaking, wobbly little creature helped itself"

With the addition of triplets to the Pelican family, domestic problems became more complicated and the operation — I use the term advisedly—of feeding is the most remarkable performance one will observe on Pelican Island. Prior to using a blind, I had been unable to discover how the naked, blind, squirming Pelican of a day or two old was fed by its great-billed parent. But with the utmost ease the croaking, wobbly little creature helped itself to the predigested fish, which, regurgitated by the parent into the front end of its pouch, was brought within reach of its offspring.

This method is followed until at the age of about three weeks the young are covered with down, when, evidently requiring a larger supply of food than their parents can prepare for them, and no longer needing predigested nourishment, they extend their feeding excursions into the throat of the patient parent, finding there entire fish, which in some inexplicable manner they generally swallow before with-

drawing their head. Two and even three young will thus actively pursue their search for food at the same time, and only their extended and fluttering wings seem to keep them from disappearing in the depths of the cavernous parental pouch.

Not for a moment do they stop their high-voiced squealing, and the rise and fall of their partly muffled screams indicate the nature of their success in getting food.

Young Pelican Feeding

Occasionally the poor judgment of the parent allied to the greed of the young, leads the latter to attempt to swallow too large a fish, when the old bird saves its young from choking to death by forcibly pulling the fish from the throat it refuses to go down. More frequently the young Pelican secures a fish not too large, but too long for it, when it swallows it as far as it will go, and, with the tail sticking from its pouch, quietly waits for the head to digest before it can encompass the whole prize. In one such instance the victim chanced to be a needle fish, which, as it would not go down head first was finally taken in the reverse direction. It is, however, when the brown wing-feathers begin to grow and the young leave the nest that feeding occasions the greatest excitement. In March, 1908, an exceptional opportunity was afforded to study the young birds not only after they had left the nest, but after they had acquired the power of flight. The early nesting of the fall of 1907, combined with favor-

able climatic conditions, had, as has been remarked, resulted in both an early and uniform advance in the development of the breeding season. Not more than thirty birds were still incubating while at least ninety-nine per cent of the young were on the wing and were approximately the same age.

A cold spell late in February had resulted in the death of at least five hundred birds just as they were acquiring the

" Extend their feeding excursions into the throat of the patient parent "

power of flight, but between a thousand and twelve hundred remained.

As we landed on the island these young, with the adults, took flight and I anticipated little success in securing photographic studies of birds, which, unlike those confined to the nest, appeared to have no fixed place of abode. Observations from a blind, showed, however, that these birds evidently did have certain definite places, doubtless in the vicinity of

the nests in which they were born, to which they soon returned after being disturbed, and it appeared also, much to my surprise, that these fully fledged birds averaging now slightly larger and heavier than the adults, were still being fed by their parents. Here indeed was the reason for the continued occupation of the home-site in order that the parent might have the least difficulty in locating its dependent offspring.

Young Pelicans After Feeding
The bird at the right has a needle-fish projecting from its pouch

Under these circumstances throughout the day, but particularly in the afternoon, the island was in a constant uproar. As many as six feeding scenes might be in progress at once, each the center of a mob of struggling, screaming Pelicans.

The adult bird recognizes its own offspring in part doubtless by locality, largely by sight, and possibly by scent. Several times old birds were seen to permit a young one to begin to insert its bill in their pouch only to discover that, apparently, it was not their chick, when it was denied further admittance to the base of supplies.

The young evidently distinguish between a bird which has food and one that has not, though so deeply are the fish swallowed, that no difference was discernible to my eyes; but beyond this they suppress any discrimination they may possess. Their motto is clearly "any old bird" provided it

"Mobbed by all the nest graduates in the vicinity"

has something in its pocket, so to speak, and on the arrival of such a bird from the fishing grounds it is mobbed by all the nest graduates in the vicinity who with a riotous shouting and clashing of wings attempt to "hold it up." Often the adult is forced to seek refuge in a short flight and make a further attempt to reach her young. Again in the struggle the load of fish may be dropped, when there is a wild scramble to pick it up, a manner of feeding at which the young seem adepts, and again, if the attacking party be not too large, the parent succeeds in driving away all but her

own, who, once he has entered his claim, is generally permitted to work it in peace. On occasions, however, the old bird does not escape so easily and two and even three of the young equalling her in size succeed in getting their heads down her throat which she expands in a way a boa constrictor might envy. It might be imagined that the best position for the adult to assume during this really terrible operation would be on the ground where the neck could be expanded and the distance to the fish shortened, and this indeed is the position from which the young are commonly permitted to secure their food; but not infrequently a feeding bird perched on a stub as high as three feet and stretched down her head and much contracted neck toward the young on the ground below.

Pelican Feeding a Young Bird Larger than Itself

The parent does not, of course, always have to fight its way through a mob to feed its offspring. Often only a bird or two is to be driven off and on such occasions the rightful young assist, the method of attack employed by both being thrusts of the bill from which no harm appears to follow. The actions of the rejected young bird are remarkable. With an only-son air he prances confidently up to the food-bearing adult and without so much as by your leave attempts to insert his bill. When, however, he receives a blow where he expected a fish, his demonstrations of disappointment are uncontrolled. He acts like a bird demented, swinging his

head from side to side, biting one wing and whirling around to bite the other in the most ludicrous manner.

It is inexplicable that the same performance, in an exaggerated degree, is gone through with by the bird which has been permitted to feed, after it emerges from the parent's pouch. For a moment it seems dazed, perhaps because of

Young Pelican after feeding
"Lays its head on the ground as though it had received a violent blow"

lack of air as well as by the size of the meal it has secured. It lays its head on the ground as though it had received a violent blow, but soon this apparent semi-consciousness is followed by the most violent reaction as the bird arising to its feet grasps its wing, waves its head and behaves in the same crazy way as the bird which has been denied a meal. Possibly this surprising exercise may aid the bird in swallowing, when the same exhibition after the bird has attempted and failed to get a meal, should be considered the result of suggestion.

The young Pelican although repeatedy disowned is often persistent in its demands for food and when only two young are present the parent frequently finds difficulty in administering to her own. Even when the right bird has succeeded in finally establishing connections with its parent, the

stranger may join it and not only share the meal but force the first comer from the table without the old bird apparently being aware of the change.

The young Pelican is not particular as to his choice of food and on four occasions during the absence of the brooding parent, which had taken wing at my approach, I saw fully grown birds take half-naked young, about the size of plucked Pigeons, from the nest and devour them, several sometimes struggling to secure the prize. Where ground-nesting Pelicans are disturbed this canibalism must appreciably increase the mortality of the nesting season.

Young Pelican After Feeding
The lump in the bird's throat is a young Pelican it has just swallowed

Birds which capture their food by diving from the air do not as a rule, so far as my experience goes, inherit this method of feeding but acquire it through imitation of their seniors. The fact that adult Pelicans rarely if ever fish near Pelican Island gave me no opportunity of observing the young with the adult on its feeding grounds.

The Adult.—No one can look a Pelican squarely in the eye without being impressed by the bird's reserved, grave dignity. The same patriarchal bearing in a man suggests years of fruitful experience and the learning of sages and prophets.

Is the bird a feathered caricature of a human prototype,

or does its white head contain the wisdom its owner's outward experience so strongly suggests. In short, where in the psychological scale, shall we place this bird of imposing presence?

I have made no experiments designed to determine the mental status of the Brown Pelican on which, however, my observations may throw some light.

During that three months of the year when the wants of its offspring make the heaviest demands upon the adult, the Pelican's daily activities apparently follow a regular routine. At the first hint of dawn certain birds, whether always the same or of the same sex it would be difficult to determine, leave the island for distant fishing grounds, flying diagonally northeast or southeast over a regularly traveled air line to the sea and then following the coast line north or south as the case may be. With a favorable wind they travel high before it, with a head wind they skim low over the waves, usually just outside the breakers.

"For distant fishing grounds"

When several birds happen to leave together over the same route the characteristic diagonal, single-file flock is soon formed and the birds progress by alternately flapping and sailing in unison, the first flap after the sail being usually given by the leader, not necessarily because he is the leader but because being in advance he doubtless

encounters greater air resistance and is the first to lose momentum when sailing. It is said that the birds go as far as forty miles to reach favorite fishing grounds, near Cape Canaveral for instance, but I have never seen them farther than ten miles from home, when, however, they showed no signs of stopping.

The First Upward Stroke of the Wing Preceding Flight
Note the separation and angle of the five outer primaries

Almost invariably the returning birds are in flocks of from three or four to as many as fifty and these lines of stately creatures flying steadily with striking power and regularity of movement constitute one of the impressive sights of the Florida coast.

The flock formation is maintained until the birds reach the island, when they separate to proceed directly to their homes, situated perhaps in different parts of the colony.

The time of the return is doubtless more or less governed by the success of the expedition, but the young seem to be fed most actively between eight and ten in the morning and two and four in the afternoon. The latest fishers reach the island when it is too dark to distinguish minor details of the landscape and at such times I have had

The Pelican Yawn

them sweep by within a few yards; nevertheless they appear to go to their nest-sites without difficulty and the resulting outcry indicates that their young do not go to bed supperless.

Menhaden form a large proportion of the fish captured and big or little they are carried not in the pouch, but too far down the throat to be visible even as a protuberance.

Most of the birds fish at sea and even if they took valuable food fish, lovers of birds as well as lovers of fish are to be considered. Better spare a mullet or two than rob the air of one of its distinguished citizens. When the day comes in which everything interfering with our acquisition of dollars and cents must be destroyed, the world will indeed be a fit abode for those who have despoiled it.

After feeding its young, the adult, if it is not too late, often goes a short distance off shore to bathe, with much loud slapping of wings and dashing of spray. The bath finished it comes to the beach to preen its feathers. A very large part of the time of both adult and young is given to the care of their plumage. The foot evidently can reach only the side of the neck and the loud rasping scratching of this part of the body is one of the characteristic sounds of island life.

After the feathers are dressed the birds generally go for a promenade in the sky when they rise to a thousand feet or more above their home, and, on set wings, sail in wide circles apparently for pure enjoyment of the exercise. At such times they are often joined by the young which are on the wing.

When several thousand birds of one species not only select the same bit of ground for a residence but build their homes side by side, one might infer that they possessed marked sociability of character; but I have looked in vain for any evidence of friendly or communal relations between the thickly grouped Pelican households. The virtual voicelessness of adult Pelicans implies in itself a limited means of communication. The birds steal one another's nesting-material with an air which plainly bespeaks a knowledge of their guilt and that they expect punishment from the birds they have robbed. This may lead to a bloodless fight in which the contestants snap their mandibles with pistol-like report or grasp each other by the bill to struggle for a few seconds. Beyond these occasional little difficulties I have

seen no evidence of either friendly or hostile relations between the adult birds. They live side by side, they go fishing together, they return together, and this association apparently satisfies an evident desire for companionship. While the formation of such island colonies may original-

"Thrust her bill deep into the nest"

ly have been due to the gradual elimination of the individuals of a species which did not nest in so favorable a locality (see "Bird Studies with a Camera" p. 195 where this idea is advanced) I now believe that among island nesting birds there is definite and intentional selection of island sites. When the Pelicans have been driven from Pelican Island they have sought refuge on another island. White Pelicans, as is remarked in a succeeding chapter, also give evidence of this actual selection of an island home. Doubt-

less gregariousness as well as the heredity of habit plays a part here.

Beyond supplying them with food and shelter essential to their existence, Pelicans seem to take little interest in their off-spring. They often step on their young in a clumsy fashion which must sometimes be fatal to very little birds. The adults whose young were devoured by larger

"Devoured by a scavenging Black Vulture"

young birds showed no resentment. In one instance the naked young of a bird whose nest was unfortunately within a few feet of my blind, died through exposure to the sun before I was aware of their suffering. Finally when, after an hour or so the parent became sufficiently accustomed to the blind to return to her nest, she (I assumed it was the mother) showed an evident though unintelligent concern at her loss. For two hours she stood near the nest containing the bodies of the poor little Pelicans returning to it at intervals to thrust her bill deep into the nest, and toss the material about, presumably searching for her chicks which, disguised in death, she seemed not to recognize. Happen-

A Portion of the Pelican Island Group
Background painted by Horsfall Bruce; birds mounted by E. W. Smith

ing to touch one of them with her bill it was flung from the nest as an object of no interest and later was devoured by a scavenging Black Vulture with whose meal the surrounding Pelicans showed no concern.

On another occasion an adult went beyond the bounds of mere routine to prevent her offspring from being imposed upon by a slightly larger bird. A fish the youngster had secured from the parent's throat became lodged crosswise in its pouch and would not go down. While attempting to disgorge and re-swallow its booty a larger bird standing near became interested and offered to assist by relieving the smaller Pelican of the fish altogether. It was on the verge of success, though evidently against the will of the smaller bird, when the latter's parent, who had probably been watching the performance, appeared upon the scene and drove the intruder off. Few incidents of this kind were noted and observation emphasizes the limited range of the Pelican's intelligence. But as one considers the conditions under which the birds live, there appear to be no factors to stimulate mental development. Their food supply never fails and is secured without competition; after the first few weeks of their lives their climatic surroundings are favorable; in disposition they are non-combative; while the nature of their nesting-resorts protects them from predatory animals. In short, life with Pelicans is not sufficiently severe to tend to character making.

Man alone appears to threaten their continued existence and from him, fortunately, those of their kin who live on Pelican Island are now happily protected. While they cannot repay their defenders with the music of Thrushes or a display of those traits which so endear the higher animals to us, they may at least claim success in filling their place in nature, while the charm of every water-way is increased by the quaint dignity of their presence.

THE FLORIDA GREAT BLUE HERON AND THE WATER TURKEY

In 1858, when Bryant located Pelican Island as "twenty miles north of Fort Capron," he took for his base the nearest settlement which then appeared on the maps of that little known region. But one will search the latest Florida maps in vain for a locality with this name, so honored in our military service.

The Fort Capron of the Indian wars is, however, the St. Lucie of to-day; the site of the old fort is still visible, and at this point one may start on the Capron Trail, which now, as then, crosses the Kissimmee at Fort Bassenger, on a ferry "flat."

On the morning of March 21, 1905, with Aden Summerlin, as guide, Mrs. Chapman and I started westward, on the Capron Trail, for a certain rookery of Water Turkeys (*Anhinga*) and Florida Great Blue Herons (*Ardea herodias wardi*) distant some seventeen miles. We camped that night in a dense palm hammock near an arm of Seven Mile Slough, where the Barred Owls discussed our appearance, in several languages. Hundreds of Louisiana Herons were beginning to nest in the button-wood grown ponds and we remained here two days to study them.

March 23, we crossed the Slough over the mile and a half ford, through the saw-grass—where I lightened the load by putting our canoe overboard and getting a tow all the way over—and reached our destination early in the afternoon.

Our camp was in the pines near the border of a great cypress swamp, in which were the ponds where the birds we desired were supposed to be nesting. White Egrets were said to have " rooked " here in large numbers but they had

been "shot out" by my guide's father—now a game warden!

It was not until the next day that we succeeded in reaching the forest-enclosed sloughs and found a place where, after some cutting of the dense undergrowth, our canoe could be launched. Doubtless it was the first boat to be

A Camp in the Palms

used here. At the same time, I discovered one of those evidences of the conflict between soldier and Indian, which are so potent in effacing the present and bridging the lapse of years. Summerlin, who knew its history, identified it as the camp-site of a body of cavalry. They had thrown up earthworks, but the long trench was now a rounded hollow and the embankment had weathered away. Their horses had evidently been tethered to a great pine at the head of the trench, the grass, for a radius of six or eight feet around the tree, being sparse and stunted. I never passed the place without forming a clear mental image of horses and troopers.

The ponds were so thickly covered with glistening

"bonnets," as yellow pond-lilies are invariably called in Florida, that the water was not visible, and it was necessary to mow a path, with a machete, to the islets on which the Water Turkeys and Herons proved to be nesting. These islets, although only a few yards square, usually held at least one cabbage palm, with an ash or willow and low bushes; their presence added largely to the beauty of a

The Home of Heron and Water Turkey
Note the blind under the palmetto at the left; also the canoe floating among the "bonnets"

scene which, with its "moss" draped cypresses, and luxuriant growth of bonnets and palms, must have made a fine setting for the Egrets, Spoonbills and Paroquets that were doubtless abundant here when the troopers camped in the neighboring pines.

The place itself, however, had lost none of its singular picturesqueness and animal life was still abundant enough

to make one forget the past in the attractions of the present. My blind was quickly erected on the islet, from which I could observe the Water Turkeys on a neighboring islet, and soon the nearly grown Ward's Herons, in a nest just above my head, were chanting their croaking food-call; the Water Turkeys, with rattling, rasping notes, came back to their nests; Barred Owls called from the gloom of the cypresses and out in the pines Sandhill Cranes were trumpeting. From the forest of bonnet leaves and roots, bull-frogs grunted and alligators whined; a sucker and a great soft-shelled turtle came to the surface to investigate a bit of orange-peel which had fallen into the water at my feet, and everywhere, in the bonnets, on the islets and in the bushes, there were moccasins. One crawled out to sun himself on the islet which was barely large enough for me, and I discovered him coiled at exactly (measured later!) three feet and six inches from my back. Doubtless he would have agreed to remain on his side if I had consented to stay on mine, but it seemed to me that an island six feet in diameter was not large enough for us both, and he, poor fellow, being the smaller and having no gun, was forced to leave—in two pieces.

About one hundred pairs of Water Turkeys were breeding on the islets in this secluded place; their remarkably well-made nests being in the bushes and trees from three or four, to fifteen or twenty feet above the water; in some instances a single islet held as many as seven.

The nests contained eggs in various stages of incubation, and young up to the downy stage. The young of the same nest, as I have observed on previous occasions, were of different ages and varied greatly in size, one nest holding young several days old and fresh eggs.

The young raise their long, slender, tremulous necks above the nest and utter incessantly a twittering peep; while the expanded hyoids so increase its size that the head appears to be placed on the neck upside down. They secure

Water Turkey and Nest

their food as do young Pelicans, Cormorants, and all other members of the order Steganopodes with whose habits I am familiar, by thrusting the head down the parent's throat. The stomach of one young bird contained three fish, the longest measuring six inches; in another a catfish was discovered. With a family which may vary in size from the newly hatched chick to one a foot or more in length, the problem of securing fish the proper size for the young is evidently more complicated with Water Turkeys than it is with Pelicans. The parent seems to bring a large supply of food; a female, on one occasion, remained at the nest about an hour and fed her young repeatedly.

Although they soar with exceptional ease, Water Turkeys alight very clumsily, virtually tumbling on to their perches with much flapping of wings and loss of balance before coming to rest. When not alarmed, they seem to take flight with much hesitation, opening and closing their wings, in preparation, several times before they venture to trust themselves to their support. When alighting near the nest, they always utter their harsh, grating calls which, if another bird chances to be near, is replied to with threatening motions of the sharply pointed bill. But although quarrelsome, they never get beyond this exchange of compliments.

Fish Crows, one of the greatest enemies of rookery nesting birds were, as usual, present, and looking every inch the thief as they hunted from tree to tree in search of unprotected eggs. At the same time, they *cawed* loudly; though why they should thus advertise their presence, unless it be to protest their innocence, it is difficult to see. One slipped up to a near-by Water Turkey's nest, from which the owners were absent, quickly took a blue egg in his bill and, with rapid wing strokes, flew to a cypress to devour it at his ease; then his appetite whetted and courage aroused, he came back to the nest and, standing on its edge, ate all the eggs remaining. The Water Turkeys sometimes pro-

tested slightly, but made no attempt to defend their homes from the black-coated robbers.

There were about fifteen Florida Great Blue Herons' nests scattered about the slough, all containing newly fledged young. Most of them were within ten feet of the water and offered an exceptional opportunity to study, and possibly even photograph, the before unpictured homelife of this splendid bird.

The blind was therefore moved to an islet some fifty feet long and a fourth as wide, from one end of which an unobstructed view could be had of a Heron's nest, containing three large young and distant about forty feet. A dense growth of young palms afforded partial concealment for the blind, which was rendered virtually invisible by a covering of dead palm leaves. The blind was arranged at the conclusion of a day with the Water Turkeys. It could be entered from the rear of the island without one's being seen from the nest, and the conditions seemed ideal for outwitting one of the most wary of Florida birds.

The young Herons were almost as easily alarmed as their parents, and, at the first sign of danger, squatted flat in the nest with close-pressed bills. The next morning, when I reached the blind without the young birds being the wiser, success in photographing the parents seemed only a matter of time. It was not long, however, before the alert attitude of the young indicated beyond question the proximity of one of the parents and, following the direction of their eager, expectant look, I discovered the splendid creature perched on the higher growth to the left, clean-cut and statuesque against the sky. She stood there calmly, showing no trace of the intense excitement which now possessed her offspring; and quietly surveyed her surroundings. Assured that all was well, with erect plumes and partly expanded wings, she slowly walked downward toward the nest, with a dignity of motion and majesty of pose I have never seen excelled by any other bird.

Great Blue Heron Approaching Nest
"With dignity of motion and majesty of pose"

Great Blue Heron Feeding Young
"Its bill was seized by one of the young"

The young now were frantic with excitement and, in chorus, uttered their *cuk-cuk, cuk-cuk* feeding call. As the parent stepped slowly into the nest, its bill was seized by one of the young. The young bird did not thrust its bill down the parental throat nor was the parent's bill introduced into that of the young. The hold of the young bird was such as one would take with a pair of shears, if one were to attempt to cut off the adult's bill at the base. In this manner the old bird's head was drawn down into the nest where more or less digested fish was disgorged, of which all the young at once partook. On one occasion, the adult disgorged a fish at least a foot in length and on discovering that it was too large for the young, the parent re-swallowed the fish and returned to a perch near the nest, while awaiting for the processes of digestion to continue the preparation of the meal.

It was with no small elation that I obtained this intimate view of a Heron family and observed this—so far as I am aware—before unknown method of administering to the wants of its young. The prospect for making still further additions to the life-history of the species, seemed admirable; but, the morning's work finished, I reached the border of the forest just in time to see my tent in the pines ahead burst into sudden flame, destroying everything in it but my photographic plates which, being at one end, were rescued by Mrs. Chapman. Paraffine used in water-proofing canvas and a spark from the camp fire had proved a disastrous combination, and work on the Herons was of necessity abandoned.

Water Turkey
They often assume this attitude while drying their plumage

THE AMERICAN EGRET

Twenty years have passed since I saw in Florida my first Egret, but I retain a clear-cut mental picture of the scene in which the bird's snowy plumage shone with surprising whiteness against a darkly wooded background. It seemed an ethereal creature, too pure for earthly existence, a veritable Bird of Paradise. Nor has subsequent familiarity in any way decreased this impression of a certain angelic quality, due no doubt to the dazzling purity of the bird's plumage as well as to the charm of its haunts.

It was the large Egret, (*Herodias egretta*) I saw. The Snowy Egret (*Egretta candidissima*) is a daintier, more exquisite bird, but, in nature, cannot always be satisfactorily distinguished from the young of the abundant Little Blue Heron, while its much smaller size makes it a far less impressive figure in the landscape than its stately relative. Futhermore, the Snowy Egret is a less shy bird and its recurved plumes are more highly prized than the long, straight " aigrettes " of the larger species and even twenty years ago, it was a comparatively rare bird in Florida.

My experiences, therefore, have been with the larger Egret, which I have long sought to find nesting under conditions suitable for reproduction in a Habitat Group. A few nests were discovered here and there, but always, when a rookery of promising size was reported, the plume-hunters arrived first and word came that the "long Whites have all been shot out."

Thus, year by year, the Egrets have decreased in number, and with them has gone one of the most distinguished figures of the Florida wilds. The state, learning the value of the treasure of which she has been robbed, has passed

stringent laws prohibiting the killing of Egrets. So, too, she has passed laws against pick-pockets, but just so long as there are pockets worth picking there will be someone to pick them, and just as long as Egrets' plumes are worth their weight in gold there will be some one to supply them, until, a passing fancy gratified, the last plume has found its way from the bonnet to the ash-barrel.

Without one promising lead to follow, I had virtually abandoned the Egret hunt, when, from another state than Florida, word came of an Egret rookery creditable to the days of Audubon. It appears that, when a vast territory was acquired as a game preserve, by a club of sportsmen, it contained a few Egrets, survivors of a once flourishing colony. After seven years of rigid protection, they and their progeny form so conspicuous an element of local bird-life that, on the evening of May 7, 1907, as I reached the region in which they lived, I saw them in dozens flying toward the still distant rookery.

The return, at nightfall, of birds to their nests, or to a fixed roosting-place, is possessed for us of that interest which is attached to all the intelligible actions of animals. The knowledge that the creature has a definite plan or purpose seems to emphasize our kinship with it. So we mark the homeward flight of Heron or of Crow and, knowing whither they are bound, travel with them in fancy to the journey's end. This has been a fatal habit for the Herons. It mattered little how secluded was the rookery; the hunter found it simply by following their line of flight.

My way to the home of the white-plumed birds was less direct than their air-line. For hours, a little home-made tug, with a swelling wave at her bow, took me through a succession of bays, canals, cut-offs and serpentine creeks, frightening the Gallinules and Blackbirds in the reeds, and surprising an occasional alligator on his favorite mud bank.

A night's rest, and in the morning the journey was resumed through park-like pine forests and under the moss-

Little Blue Herons

There were thirty-two nests in this bush. One bird in the white plumage of immaturity

Louisiana Heron and Nest

hung live-oaks with every tree and plant by leaf and blossom, and every bird by plumage and voice, proclaiming the sweetness, beauty and joy of May. Ten miles of spring's pageant brought me to the moat of the Egrets' stronghold. Here I entered a boat, to pass through an apparently endless, flooded forest, known as the Lake of the Great Reserve.

There are delights of the water and delights of the wood, but when both are combined and one's canoe-path leads through a forest, and that of cypress, clad in new, lace-like foliage and draped with swaying moss, one's exaltation of spirit passes all measurable bounds. No snapping of twigs or rustling of leaves betrays one. We paddled so easily, so noiselessly, that we seemed as much inhabitants of the place as the great alligators that sank at our approach.

The Fish Hawks whistled plaintively, but settled on their nests as we passed below them; the Wood Ducks led their broods to the deeper woods; Pileated and Red-bellied Woodpeckers, Crested Flycatchers, Tufted Tits and glowing Prothonotary Warblers, at home in holes in the cypress; Parula Warblers weaving their cradles in the Spanish moss—all accepted us as part of the fauna, and it was not

Cypresses in Which the Egrets Were Nesting
The blind may be seen in the upper right-hand corner of the picture

until we reached the first dwellings of the rookery that our presence caused alarm.

Here, at the tops of the tallest cypresses, from seventy to one hundred feet from the water, the Great Blue Herons had built their broad platforms. With protesting squawks, they stretched their legs, folded their necks and took to the air, leaving their nearly fledged young to peer over the edge of the nest at the disturbing object below. With no less

concern, I looked at the disturbing object above. If the Egrets had chosen similar nesting sites they could be photographed only from a balloon!

"With curved neck and streaming plumes"

Beyond the Great Blue Herons, was a settlement of the singularly marked Yellow-crowned Night Herons. Their nests were within fifteen feet of the water, but they slipped away so quietly that only close watching showed them disappearing through the trees beyond. For two miles we paddled thus in a bewildering maze of sunlit, buttressed cypress trunks with shiny, round-headed "knees" protruding from the water, and with every branch heavily moss-draped. The dark waters showed no track, the brown trunks no blaze; we seemed to be voyaging into the unknown.

Finally, the environs were passed and we now approached the most densely populated part of the rookery. Thousands of Louisiana and Little Blue Herons left their nests in the lower branches and bushes, their croaking chorus of alarm punctuated by the louder, more raucous

A Sudden Turn

squawks of hundreds of Egrets, as they flew from their nests in the upper branches. It was a confusing and fascinating scene, an admirable climax to the passage through the weird forest.

For a time, I was content to sit quietly in the boat and revel in the charm and beauty of the place, my enjoyment unmarred by the thought that at any moment Satan, in the guise of a plume-hunter, might enter this Eden.

The Little Blue and Louisiana Herons nested at an average height of from six to eight feet. One bush held no less than thirty-two nests, all of which contained eggs, few young of either species having yet been hatched. The

"Ventured to alight in the home tree"

Egrets nested at an average height of forty feet. Eggs were in some nests, while in others there were nearly fledged young. While far less shy than I had before found them, the birds were still abundantly wary, and obviously could be observed to advantage only from concealment. After

"Came cautiously to the more distant branches"

Egret Feeding Young

some search, a group of nests was discovered, which it was believed could be studied and photographed from a neighboring tree, distant some thirty feet. The umbrella blind was therefore placed in the tree, at a height of forty-five feet, and liberally draped with Spanish moss. It was arranged to fall over a limb which, for several hours during each of the three succeeding days, served as a perch from which my notes and photographs were made. I have had more comfortable seats, but few that were so enjoyable. From the concealment of the same blind, it had been my fortune to watch Flamingos, Pelicans and many other ground-nesting birds at close range; but never before had I attempted to enter a bird colony in the tree tops, and the experience was as exhilarating as it was novel.

The Little Blue and Louisiana Herons soon returned to their nests below, the former, noisy and quarrelsome, calling at each other notes which sounded strangely like *tell you whàt, tell you whàt;* the latter were less demonstrative and

more quiet. The Egrets did not accept the situation so readily. Seven pairs were nesting in the trees near me. Some had eggs, others young birds in various stages of development. Flying to and fro, with curved neck and streaming plumes, the parents inspected the blind for some time before they ventured to alight in the home tree. Then

An Egret Family After Feeding

they came cautiously to the more distant branches, there to remain indefinitely, while uttering a protesting rapid *cuk-cuk-cuk,* with the regularity and persistence of a metronome. Their strong desire to return to their nest was expressed in an alertness which led them to make frequent changes of attitude. In a large series of pictures of waiting birds, no two have the wonderfully expressive neck in the same position. It is remarkable how the pose of this member affects a Heron's appearance.

Doubtless, the young birds were not a little puzzled by the unusual reluctance of their parents to administer to

their wants. In vain they uttered their frog-like *kek-kek-kek,* and stretched their necks hopefully. The old birds were not assured. So the young resorted to their customary occupations of leg- or wing- stretching, or yawning, or preening a brother's or sister's feathers, picking at imaginary objects here and there; all good exercises for growing birds. The larger ones made little journeys to the limbs near the nests, the necks taking a different curve with every movement, and expressing every emotion from extreme dejection to alert and eager expectancy. Finally, as the old birds were convinced that the blind was harmless, their reward came. With harsh, rattling notes and raised crest, one of the parents alit near the nest. Its superbly threatening attitude was clearly not alarming to the young birds, who welcomed it by voice and upstretched, extended neck. Gravely the parent stood regarding its young, while its crest dropped and its pose relaxed. Then, as it stepped to the edge of the nest, it lowered its head, when its bill was immediately seized by one of the youngsters. The feeding scene which followed was exactly like that described in the chapter on the Florida Great Blue Heron.

This Heron rookery may be described as a by-product of a reservation maintained primarily for hunting purposes. The immediate response of the surviving birds to the protection given them when their almost depleted rookery passed into the possession of the sportsman's association, now owning it, is encouraging evidence of what may be done in other localities, if the laws are enforced. Such work, however, should not be undertaken without the assurance that it will be continuous and adequate. The co-operation of the National Association of Audubon Societies, should be secured. In its hands a small endowment may be made to accomplish wonders in bird preservation.

CUTHBERT ROOKERY

Cuthbert Rookery is probably the last rookery in Florida at all comparable with those great gatherings of nesting birds formerly common throughout the state. Rookeries of Ibises, or Cormorants, of Little Blue and Louisiana Herons and other nonplume-bearing birds may still be found by those who know where to look for them. But at Cuthbert alone, so far as I am aware, will one find all the birds mentioned, together with Spoonbills, American and Snowy Egrets. This rookery is situated in what the maps term the "Great Mangrove Swamp" which borders the Everglades at the southern extremity of Florida, and is about seven miles from the coast, at a point known as Snake Bight, some twelve miles east of the settlement of Flamingo. The proposed extension of the Florida East Coast railroad to Cape Sable would have passed within a mile or two of it.

Cuthbert Rookery was discovered some twenty years da. It has been "shot out" repeatedly, but its isolation and comparative inaccessibility, together with the absence of fresh water, make it worthy the plumer's attention only when the progeny of the birds which have escaped the last raid, have become sufficiently numerous. Cuthbert's isolation also makes it a refuge for birds which have been "broke up" in less remote places, and it is not improbable that the last Snowy Egret and Roseate Spoonbill of Florida will be shot at this point.

Cuthbert Rookery was discovered some twenty years ago by the man for whom it was named. He is reported to have killed $1,800 worth of plume birds on his first visit. The first ornithologists to reach Cuthbert Rookery were A. C. Bent and H. K. Job, who visited it under the guidance of

Warden Guy Bradley in May, 1903. Mr. Bent's notes on the birds found breeding there have been recorded in "The Auk" (XXI, 1904, pp. 20-29:259-270), while in his "Wild Wings" Mr. Job has given a graphic account of his experience.

I made four attempts to reach Cuthbert Rookery before succeeding. In May, 1904, while *en route* to it, I was intercepted by Warden Bradley in the Keys, near Tavenier Creek, with news that the rookery had been "shot out." Under his guardianship, the "white birds" had increased to numbers, which, with aigrettes selling at thirty-two dollars an ounce, made the venture worth the risk, (for there was a risk; as the man who attempted to "shoot out" a rookery while Bradley was on guard would probably have lost his own "plume"); the warden was watched and in his absence his charges were slaughtered. The man who was with Bradley when he returned to the rookery told me "you could a-walked right around the ruke-ry on them birds' bodies; between four and five hundred of 'em."

The following year, while working toward Cuthbert, my outfit was destroyed by fire and operations, necessarily, were postponed. That summer, Bradley was shot while on duty, a death he had long predicted, and no further effort was made to visit the rookery until 1907, when the plan was defeated by conditions encountered in the Bahamas. In 1908, however, the trip was made without mishap, and, once started, proved to be a by no means difficult undertaking. My special object in visiting Cuthbert was to make studies on which to base a group of Roseate Spoonbills. When not disturbed, these birds were said to lay in February and if all went well they might be found with young the latter part of March, before a possible looting of the rookery by plumers.

On March 25, therefore, with A. C. Bent, whose former experience proved of much value, and Louis Fuertes, I sailed from Miami, at noon, on the "Pearl," a 40-foot jig-

ger-rigged sharpy with a 10 horse-power engine, in command of Capt. Burton. At sunset, we anchored under Pumpkin Key and, taking the "inside route", reached Man-o'-War Key the following evening. On the morning of the 27th, we landed on Man-o'-War Key, finding a pair of young Bald Eagles about to leave the nest and a pair of Turkey

The Crew of the "Pearl"

Vultures about to leave the egg. Later, on Clive Key, we discovered "*Ardea wuerdemanni*" breeding, and at 4 p. m. dropped anchor off Flamingo. If Capt. Burton's information was reliable, we had arrived just in time to prevent Cuthbert Rookery from being "shot out", it being reported that a party of plumers had planned to start for the rookery the following day. I regret that I cannot express to these gentlemen in person, my thanks for the discreet consideration which prompted them to postpone their visit.

The next afternoon, accompanied by Louis Bradley,

brother of the late Warden, and "Melch" Roberts, the journey was continued toward Snake Bight, the "Pearl" being run to the eastward, until she grounded in about two and a half feet of water. Going aground is so normal an accompaniment of a cruise in the Florida Keys that it generally occasions little comment and the skipper waits philosophically for the rising tide to float his craft. On the present occasion, higher water at midnight enabled the "Pearl" to get about a mile nearer the Bight.

March 29, when the great glowing sun rose over the Keys we were already well on our way, in small boats, toward the Bight. In occasional vague channels, the water was between two and three feet deep, but for the greater part of the way it measured less than a foot and at times it was necessary to push the boat over the mud barely covered with water. A dense growth of brown, broad-bladed turtle grass gave a fairly good hold for the oars in pushing, and furnished support when wading.

The air was clear, the heavens wreathed with exquisite cloud forms, the waters, rippled by a gentle breeze, sparkled in the long rays of the sun and the scene was possessed of a great charm and beauty. Ospreys and Brown Pelicans, each fishing after the manner of its kind, gave life to the air; the first, taking deliberate aim, with quick beating wings hovered above his prey before striking; the latter, making snap-shots, plunged down to the waters without so much as a preparatory flutter.

We were now in the very heart of the home of the Great White Heron and at least fifty of these birds were in sight at a single moment; those toward the sun, so dark, they could with difficulty be distinguished from Ward's Heron; those to the west, gleaming like snow.

Often the boat ran on redfish or drum, which darted away with a swelling wave above them, or passed close to the two keen fins of a great saw-fish or the single fin of a shark. Porpoises were hunting in water scarce deep enough

to float them and Fuertes saw two, evidently acting in concert, round up a school of mullet and catch them in the air as they leaped from the water.

On the Way to Cuthbert Lake

It took us five hours to reach the mouth of Snake Creek, near the head of the Bight, and the tops of the "Pearl's" masts were then barely visible; thanks to favorable conditions and Roberts' willing exertions, I greatly enjoyed this usually dreaded, much prolonged landing. There were great beds of Willet and White Ibis on bars at the head of the Bight, and six Reddish Egrets were fishing there in their eager, alert, graceful way.

At the mouth of Snake Creek we paused for breakfast, resuming our journey through the mangroves to Cuthbert

Lake. I had formed a belief that this part of our route would be traversed with great labor, but I do not recall a more interesting and enjoyable boating trip. For four hours we followed channels through the mangroves, often so narrow that there was barely room for the passage of the boats. The branches formed a dense canopy overhead, and marks of the axe showed they had grown as freely below, in places, limbs and roots having been cut out every yard of the way.

There were obvious advantages in not being pioneers over this trail! As the shores became somewhat drier, the trees grew higher. The stilt-like, many branched mangroves took the most untree-like forms, their limbs, with those of the button-woods, being laden with orchids, wild pines and other parasitic epiphytes. In the background, triangular stalked cactuses, giant ferns, and a small fan palm, I have not seen elsewhere in Florida, grew profusely. Seen through a picturesque tangle of plant-burdened mangrove limbs, down an aisle of dark water, they produced an impression of the most luxuriant tropical vegetation, and only the birds were needed to make one believe he was on some Lower Amazonian *igaripe*. Birds, however, were not common along the wild borders of these attractive streams; a few Cardinals, Carolina Wrens, and White-eyed Vireos, all in their south Florida forms, being virtually the only species observed.

At intervals, these shaded passages opened into lakes, six in all, varying in size from a quarter of a mile to between two and three miles in length. The larger lakes were set with islands, breaking the distance and forming charming vistas all bordered with mangroves. Here, still lingered hundreds of Coots and Lesser Scaup Ducks with a few Blue-winged Teal. Here, too, were numerous fish; a bass and a small tarpon leaping into one of our boats as voluntary contributions to our larder.

The exit from one lake into the passage to another was

sometimes at the end of the lake, sometimes at the side masked by over-hanging limbs, which it was necessary to raise to permit the entrance of our boats. If Cuthbert Rookery had not been discovered from the rear, it would probably still remain unknown. It is difficult to believe that anyone, unguided, could have reached it over the course we travelled.

Cuthbert Lake is a mile and a half long. The rookery is on a mangrove-grown island, not over an acre in extent, a mile from the entrance to the lake, but with the sun at our backs as we emerged from the last creek, we distinctly saw pink-plumaged birds flitting against the dark green background of their home. They were the first Spoonbills I had ever seen in Florida, during over twenty years bird study in the state. I seemed to have overtaken primitive Florida bird-life where it was making its last stand.

In the face of a stiff breeze, the boats were urged over the brackish, amber-colored, shallow waters, the hard, rock bottom making each push of the oar yield its full return. But the life of a mangrove rookery does not reveal itself until one is near enough to startle the birds resting or nesting on the branches beneath the dense foliage, and it was not until we were within a hundred yards of the island that we could form an idea of the kinds and numbers of its occupants. Then, the alarmed birds began to appear and we saw that there were between thirty and forty Spoonbills, a dozen or more Snowy Egrets, three or four hundred American Egrets, at least two thousand Louisiana Herons with possibly fifty Little Blue Herons, several hundred White Ibises and a few Cormorants and Water Turkeys. It was a fine sight but was soon robbed of its chief attraction by the departure of the Spoonbills and most of the White Herons, which gathered in a gleaming flock in trees on the north shore of the lake. The Louisianas having no commercially valuable plumes to dispose of, retain a limited confidence in man and expressed their fears only by much calling and

flying about the rookery without actually leaving it. On landing, we found that the Spoonbills and American Egrets had nests with eggs. Probably also the Snowy Egrets were nesting but we did not succeed in identifying their eggs. The season was less advanced than we had hoped to find it, but a later visit would doubtless have shown us only a scene of devastation, and we considered ourselves fortunate in finding an exceptionally large number of "White" birds.

Snowy Egrets

Their presence was attributed in part to the prolonged drouth which had resulted in the desertion of other rookeries, in part to molestation elsewhere.

It is difficult to study and photograph satisfactorily the home-life of birds which nest in mangroves. They cannot be seen well from below, while the foliage screens them from

above and, they build so near the tops of the trees, it is generally impossible to get a suitable point of vantage for concealment at their level. I arranged my blind, however, in what appeared to be the best place, and left the rookery for the camp which our men had made back of the mangroves, amid the palms,

Louisiana Herons

"Perched on the mangroves silent and alert"

ferns, and orchid-hung trees on the nearest mainland, distant a quarter of a mile. My first act now, was to erect a bar, in preparation for the horde of mosquitoes which are usually the most serious problem in life here, but, be it said to the credit of this insect, not ten were seen during our stay.

Observations made early the following morning, from a tree-top near our camp, showed that apparently all the Spoonbills and many of the Egrets had returned to the rookery after our departure the preceding evening; but when we attempted to call upon them they quickly left without waiting to inquire the nature of our visit. There being no young birds to attract them, it was evident that we could not hope to observe these birds until they returned in the afternoon. I therefore entered my blind at two o'clock remaining until nightfall. While I made no especially noteworthy observations or photographs, the experience brought me very close to the spirit of rookery life and possessed in a high degree that intense interest aroused by one's unsuspected presence among a great gathering of birds. During the early part of the afternoon the Louisiana Herons—known locally as "Loosies"—claimed my attention. Their nests were everywhere; in the trees and bushes from three or four feet, to fifteen or twenty feet above the ground. Some were near the drier central part of the island, but by far the greater number were in the bordering mangroves. Most of them contained the full set of three fresh eggs, but the birds were still animated by the excitement of mating and in contest or display created a confusing variety and volume of sounds. When perched on the mangroves they were silent and alert, but encountering a mate or rival, in the branches below, both uttered a loud, sing-song, *qua-haw, qua-haw, qua-haw, qua-haw,* or *quit-it-now, quit-it-now, quit-it-now,* as with neck feathers bristling until this part seemed three times its usual diameter, and crest raised, they pointed their bills upward and half-opened their wings. The action revealed the function of the elongated neck-feathers of this species, which were so ruffled that the bird seemed to be wearing a feather boa. While not shy, the birds were nervous in the extreme and the snapping of a twig was followed by silence and, with a rush of wings, the sudden flight of virtually every bird that heard

it. But their alarm was quickly forgotten and in a few minutes they had returned and the *qua-haw* chorus was again in full blast. They uttered also other notes; among them a singular growling call which no one would think of attributing to a Heron. With but few exceptions, the birds observed were in full nuptial plumage, with the face and base of the bill blue, but several, doubtless non-breeding birds, were in winter dress.

The nests of the American Egrets and Spoonbills were both in the mangroves, often near each other, at an average height of ten or twelve feet. Aside from the marked difference in their eggs the much larger twigs employed by the Spoonbills made their nests easily distinguishable from those of the Egrets. The Spoonbills' eggs were fresh; those of the Egrets had been incubated for about ten days.

In the absence of their owners, Fish Crows and Florida Crows played havoc with the eggs in these nests as well as with those of the Louisiana Herons, when opportunity offered. But although Crows may be considered the natural enemies of Herons, whose rookeries they regularly frequent in search of eggs or young birds, the Herons paid no attention to them and one could but contrast their conduct with that of the Kingbird when a Crow ventures near its nest. Only the knowledge that the rookery was doomed, warranted us in causing the destruction entailed by the Crows' depredations. In view of the plumers' proposed visit, I confess I spared no effort, once our work was done, to drive the Egrets and Spoonbills from the rookery, in the hope that they might escape a worse fate than being robbed by Crows.

The Egrets returned in only small numbers and perched no nearer than fifty yards from my blind, at which distance I attempted to photograph them with a 23-inch lens, having on my ground glass at one time, the American and three Snowy Egrets.

These birds were suspicious and ill at ease, taking alarm at the slightest unusual sound. Bradley, while hunting in

the saw-grass, in the Everglades at the north, narrowly escaped being bitten by a rattlesnake, which he shot with his rifle. Later, he stated that at the time he was a mile and a half across the wind from the rookery. The report of his gun was barely noticeable but every White Egret in the rookery sprang into the air as though it had been fired at and flew rapidly from the rookery. Several similar instances of the remarkable development of this bird's fear of man and his ways were observed, and herein lies its only hope of safety. As a plumer was reported to have put it, the birds are now so excessively shy that "you can't even *set* in a ruke-ry without every bird a-leavin' it."

The exquisite Snowy Egrets, virtually the last of their line in Florida, seemed less wary than the American Egrets, as might be predicted perhaps from their smaller size, a fact which may account for their more rapid decrease.

As the sunlight failed and the polished mangrove leaves passed into cold shadow, birds began to return to the rookery for the night. Flock after flock of White Ibises, with bright red feet and faces, came to roost in favorite trees; with much talking the Louisiana Herons greeted birds that had been absent during the day; Turkey Vultures perched in rows on the branches of a dead tree, and, suddenly, with a *woof-woof-woof* of wings six Spoonbills lit up my foreground. One of them perched within fifteen feet of me. Other Spoonbills flew overhead, evidently reconnoitering, and it was when seen against the intense blue of the zenith that their peach-blossom color appeared to take its deepest hue. Their flock-formation was the diagonal, single file of White Ibis but, unlike those birds, they maintained a steady flapping, uninterrupted by short sails.

As it grew darker, the birds became more numerous, pouring into the rookery from every side, and as they settled for the night, disputing the possession of some perch with their neighbors, there arose a veritable babel of voices. The Louisianas added new *chucks* and squawks to the *quit-*

Roseate Spoonbill

it-now chorus; there was the deep, rasping guttural rattle of the larger Egret; the singular liquid, rolling *woòla-woolà* of Ibis or Spoonbill, I could not determine which, while from below, Coots uttered their explosive *chut* and Florida Gallinules drew on their limitless vocabulary of hen-like notes.

Their keen sight dimmed by the gloom, the birds were less shy. A Louisiana Heron sought what was doubtless his regularly frequented perch almost within reach of my foot, others took adjoining limbs, and, as the crowning event

of the afternoon, a Spoonbill and two Snowy Egrets roosted in the same tree with me. Surely this was an honor these rarest of American birds have accorded few ornithologists. It was almost dark when I left the rookery but birds were still returning to it, and with the air of one who had waited with a purpose, Roberts said that " Long Whites " would come back as late as nine o'clock.

Cuthbert Rookery should be preserved, both because it is a fine example of a type of communal bird-life, for which Florida was once distinguished, and because it will be the last refuge for several species of birds, which, without such protection, will shortly become extinct in the Uinted States. The task, however, would require the employment of two wardens for at least four months of each year, and it should be undertaken only when it is assured that through lack of funds or for other reasons, the plumers would not eventually reap the results.

" Spoonbills flew overhead "

PART IV.

BAHAMA BIRD-LIFE

THE FLAMINGO

THE EGG BIRDS

THE BOOBY AND THE MAN-O'-WAR BIRD

Flamingo and Chick

Compare the decurved bill of the adult with the straight bill of the young

BAHAMA BIRD-LIFE

INTRODUCTORY

To the naturalist there is an unusual interest in the study of island life. An island may be a world with a definitely known history. Possibly we may even give the date of its appearance, as bar, reef, or cone, above the waters. In attempting, therefore, to analyze the life of such islands we are not confronted by those perplexing problems which often render similar efforts with mainland faunas so far from satisfactory.

The Bahamas, for example, present a comparatively simple case. The shallow waters of the Bahaman Bank support a great variety of lime-secreting animals—corals, gorgonias, algæ, echinoderms, mollusks, etc., whose skeletons ground up by the action of the waves make a calcareous sand of which every island in the group, from Great Bahama, to Turks Island, a distance of some 550 miles, is composed.

It is not essential to describe the æolian process through which these islands were formed—so well illustrated by the exposure in the approach to the Queen's Stairway at Nassau—but it is important for us to know that there is no geologic or biologic evidence to show that they have ever been connected with other land. They belong, therefore, to the class which Wallace has designated as Oceanic Islands as opposed to Continental Islands, like, for instance, Trinidad or England and Scotland.

Island-making is still in active progress in the Bahamas and one has only to cruise through the group to see islands in every stage of development and obtain, as it were, an epi-

tome of its geologic history. Closer study would reveal the gradual growth of animal and plant life, as the islands themselves have increased in age and become suited to support a flora and fauna.

Restricting our attention to birds, we find that they are the very earliest forms of life to take possession of these new bits of the earth's surface; these little worlds. Long before plants obtain a hold on the water-worn limestone of the just born key, the " Pimlico " (Audubon's Shearwater) and the " Egg-birds" (Sooty, Bridled, and Noddy Terns) come to them. The keys furnish a home in which free from molestation—except by man—they may lay their eggs and rear their young, while the surrounding waters afford an unfailing supply of food. Later, after sedge (*Borrichia*), sea lavender (*Tournefortia*), bay cedar (*Suriana*), sea grape (*Coccolobis*), prickly pear (*Opuntia*), and other pioneer forms of vegetation have covered the rocks with a dense, scrubby growth, they become suitable for the occupation of White-crowned Pigeons, Ground Doves, Honey Creepers, Vireos (*Vireo crassirostris*) and Bahama Mockingbirds. Thus we advance from stage to stage until we reach the pine forests of the older islands with their Tanagers (*Spindalis*), Warblers, Woodpeckers, and Flycatchers.

There have now been recorded from the Bahamas two hundred and four species and subspecies of birds (Riley, " The Bahaman Islands," Macmillan Co.) Of this number, about one hundred and eight nest in the islands and most of these are resident there throughout the year. The approximately ninety-six non-breeding birds are, with few exceptions, migrants from eastern North America. Many of them winter in the Bahamas, while others use them as stepping stones to and from more southern winter homes. In no instance, unless they breed in the same latitude on the mainland, have these migratory birds become permanently resident in the islands.

Of the one hundred and eight breeding species, no less

than forty-four have become sufficiently changed from their ancestral stock to be designated as new forms or species. In only one instance, and that, strange to say, is supplied by a Swallow (*Callichelidon cyaneoviridis*), has this differentiation progressed far enough to be accorded generic rank. In the remaining forty-three cases it is so slight that in almost every instance it is possible to point with assurance to the particular species from which it is believed the Bahaman bird has been derived.

Such an analysis shows us that Cuba has made the largest contribution to Bahaman bird-life, while Hayti and Florida have been drawn on to a lesser degree. Of evidently fortuitous origin are some half-a-dozen birds apparently derived from Mexican or Central American species. The ancestors of these birds possibly owe their occurrence in the Bahamas to the action of tropical storms. Blown to an island, their opportunities for establishing themselves would be far more favorable than on the more thickly populated mainland.

As to the causes which have been potent in producing these peculiar Bahaman forms little can be said. We may assume that changed conditions of environment acting on isolated species, have resulted in their evolution into new species, presumably better adapted to new surroundings. In the further division of a Bahaman species into two or more races, each restricted to a single island, the case becomes more perplexing. We have not different physiographic or climatic conditions to the influences of which we may ascribe the changes observed. On the contrary, we find different forms of the same species inhabiting islands almost within sight of each other, where all conditions of soil, climate, and flora are essentially similar. Perhaps we can assume here that through the continued isolation of a comparatively small number of individuals, certain characters, due originally purely to individual variation, have became perpetuated and specific. Among a smaller number of birds

the extent of variation would not be so wide; but this would be counterbalanced by the fact that any dominant character would be far more likely to be preserved through the forced interbreeding of closely related individuals. This would also hasten the consummation of permanent forms; the rate of divergence among island-inhabiting species being, therefore, more rapid than among those of the mainland.

The absence of terrestrial mammalia on oceanic islands greatly simplifies the problem of existence for species whose habits render them subject to attack from predaceous animals. Species which have become extinct on continental areas, therefore, often continue to exist on oceanic islands which thus play the part of protectors as well as creators of species. The Flamingo, for example, is known in Florida only as an increasingly rare winter visitor to the southern coast; but in the Bahamas, man appears to be its only enemy, and, in favorable localities, where it is secure from molestation, this bird continues to exist in large numbers.

Sooty Tern

THE FLAMINGO

There are larger birds than the Flamingo, and birds with more brilliant plumage, but no other large bird is so brightly colored and no other brightly colored bird is so large. In brief, size and beauty of plume united, reach their maximum of development in this remarkable bird, while the open nature of its haunts and its gregariousness seem specially designed to display its marked characteristics of form and color to the most striking advantage.

When to these more superficial attractions is added the fact that little or nothing has been known of the nesting habits of this singular bird, one may, in a measure at least, realize the intense longing of the naturalist, not only to behold a Flamingo City—without question the most remarkable sight in the bird world—but, at the same time, to lift the veil through which the Flamingo's home-life has been but dimly seen.

Flamingos belong to the group of birds which in the later Tertiary Period doubtless were of circumpolar distribution and are now confined to the warmer parts of both hemispheres (see also remarks on the former distribution of Pelicans).

Two species exist in the Old World, four in the New. Of the latter, the largest, brightest, and most common species is the American Flamingo (*Phoenicopterus ruber*) which is found from the Bahamas and southern Florida (irregularly, in winter) to Brazil and the Galapagos. Probably in no other part of the area inhabited by this bird is it more abundant than in certain Bahaman islands. Here, the vast shallow lagoons and far-reaching "swashes" contain an apparently inexhaustible store of small, spiral shell (*Cerithium*) upon which it appears to feed exclusively. These lagoons

also afford it a home where, in the absence of all other predaceous animals, man appears to be its only enemy.

The Bahamas, therefore, are not only the best but the nearest ground in which the American naturalist may hope to study the Flamingo during the season of reproduction. Indeed, it was in the Bahamas that C. J. Maynard, in 1884, and Sir Henry Blake, in 1887, first reported from actual observation, the inaccuracy of the story that Flamingos "straddle" their nests with their legs dangling on each side —a myth which, originating with Dampier, in 1669, had persisted for nearly two hundred years, in default of more definite information. At about the same time, Abel Chapman and Lord Lilford, through their explorations in Spain, relieved the European species from the same awkward position, which it had held—in natural history literature, at least—for so long a period. None of these naturalists, however, appears to have established intimate relations with the Flamingo. Their brief observations were made either from a distance or when the birds had been frightened from their nests. They were not so fortunate as to discover young Flamingos, nor did they attempt to use the camera.

It was in the spring of 1902 that I first went to the Bahamas in search of Flamingos. A plan long in mind then matured under exceptionally favorable circumstances, and the story of this and a succeeding expedition of 1904, as told in "The Century" for December of the last named year, appears to have aroused an interest which possibly warrants the addition of certain details here.

On April 22, 1902, with J. Lewis Bonhote, Mrs. Bonhote, Mrs. Chapman, Louis Fuertes and a crew of seven negroes, I sailed from Nassau in the 60-foot schooner " Estrella " bound for Inaugua. As a former secretary to the governor of the Bahamas, Mr. Bonhote had enjoyed exceptional opportunities to secure information which proved of the first importance. Unfortunately, our plan to visit Inaugua was prevented by an attack of measles which, on the third day

out, fell to my lot. Returning to Nassau, Mrs. Chapman and I were placed in an abandoned lunatic ward of the Colonial Hospital, which on one side was bounded by the lepers' compound, while the quarters for the insane were somewhat further removed on the other. At our door was a large cistern occupied by a thriving colony of tree toads whose united voices, echoing in their cavernous home, often made it impossible to distinguish the cries of our demented neighbors. The experience was not devoid of novelty.

In place of the trip to Inaugua, for which time was now lacking, Bonhote and Fuertes decided to go to southern Andros, where the former had learned through the Rev. F. Barrows Matthews, of a Flamingo rookery which Mr. Matthews had visited in 1898. It was agreed to make camp near the coast and use small boats to reach the site of the rookery while the schooner was to be sent back for me.

Two weeks later I joined the camping party. They had visited the old rookery and explored the surrounding country seeing many Flamingos but finding no occupied nests. No efforts had been spared to secure specimens of the Flamingo, Fuertes especially desiring one to paint, but thus far he had been unsuccessful, and while this narrative is not a record of birds killed, the manner in which the first two of our total of four Flamingos were secured went so far toward compensating me for my fortnight with the lepers and lunatics that I cannot resist the satisfaction of describing it.

The day following my arrival, being still too weak to hunt, I was landed on a comparatively open place on the banks of the creek at the mouth of which the "Estrella" was anchored, while the boat continued toward the interior in search of fire-wood. The discharge of my gun startled two Flamingos, which, unseen, had been feeding in a nearby lagoon. They headed for the interior, but, seeing the boat, turned to fly down the creek, and from my hiding-place behind a mangrove both were secured as they passed. Later

in the morning, and not fifty yards away, I took the first specimen of Northrop's Oriole collected since the discovery of the species by the late Dr. John I. Northrop, on Andros, in 1880; two visits from fortune which, I fear, Bonhote and Fuertes, whose plans I had so sadly disturbed, did not consider altogether deserved!

Painting the First Flamingo

It was now decided to visit the Washerwoman Keys where Terns were nesting, while awaiting a possible return of the Flamingos to their old nesting ground; but when we reached the place on May 14, there were still no signs of re-occupation.

This was my first visit to even a deserted Flamingo City and I examined its ruins with the interst of an archaeologist finds in the dwellings of a lost race.

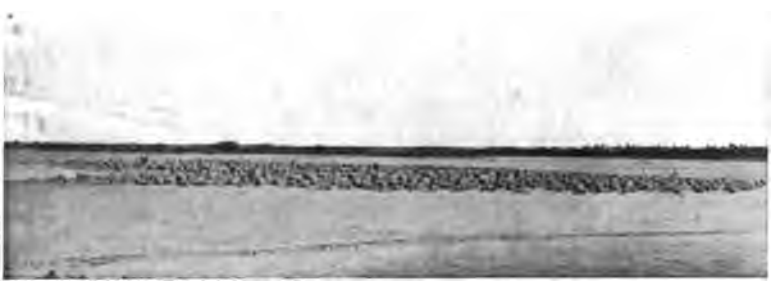
Exploration of the surrounding country showed that it had been regularly frequented by Flamingos during the

nesting season. Within a radius of a mile, no less than eight groups of nests were discovered. They exhibited successive stages of decay from the old nests, which had almost disappeared before the action of the elements, to those which were in an excellent state of preservation and had evidently been occupied the preceding year. Indeed, in one of these nests, I found an old egg.

Some nests were placed among small mangroves, others were hidden in the well-grown mangroves, and one colony, which I subsequently learned from Mr. Matthews, had been occupied in 1898, was situated on a sand-bar two hundred yards from the nearest vegetation. All the groups examined contained several hundred nests, and the one on the sand-bar, by actual count of a measured section, was composed of 2000 of the little mud dwellings. What an amazing sight this settlement must have presented when it was inhabited by red-plumaged birds standing as closely massed as the position of the nests would indicate! With the scene clearly pictured in my mind, I knew I should never be content until I had seen it in nature.

The thousands of nests seen were built of mud, which, I learned later, was scooped up by the bird from about its feet. In selecting a nesting-site, therefore, the birds are governed by the condition of the ground, which must be soft enough to serve as mortar. When the rainy season comes early in May, and the rainfall is heavy, the water on the flat swashes runs back into the mangroves and the birds then build in the bushes. But when the rains are delayed, or are light, the birds must come more in the open about the borders of the lagoons. This enforced proximity to water, brings with it danger from tides or the floods following a tropical downpour, and the nest is therefore made high enough to protect its contents from a rise in the water; the average height being about ten inches.

Flamingos in small flocks containing from three or four to fifty individuals, were seen, but they were excessively



A Deserted Flamingo City Containing about 2000 Nests

A Detail of the Preceding Illustration

shy. If, without cover, we attempted to approach nearer than two hundred yards, there was a sinuous movement along the line of birds as the long slender necks were raised and the birds regarded us intently. Drawing nearer, we could hear a murmur of goose-like honkings as the birds, in slow and stately fashion, began to move away step by step. Then the leader sprang into the air, stretched his long neck and legs to the utmost, and, followed by other members of the flock, in diagonal single file, generally flew out of sight. It is surprising how far, under proper light conditions, even a small flock of Flamingos may be seen. Long after one fails to distinguish the individual, in the waving, undulating line of birds, the flock shows pink against the sky like a rapidly moving wisp of cloud which finally dissolves into space.

The "Estrella" was rated an exceptionally seaworthy vessel in the Bahamas; but the Bahaman sailor's standard of excellence would not, I fear, pass current in a marine insurance office. Bahaman boats being built largely of wreckage, are, so to speak, born old; and the "Estrella" was no exception to the rule. From the beginning of our cruise she had leaked so badly that, after his turn at the wheel, every man was obliged to pump for a certain period. This period gradually increased in length and the matter was brought to a focus, when we were about to set sail for Nassau, by the discovery of numerous jelly fish in the hold.

Even a Bahaman seaman could not ignore this sign, and Captain Stiles announced that the "Estrella" would probably go to the bottom if we sailed without stopping her leaks. How this was to be done without dry-dock or ways was not apparent; but voyagers here early learn the necessity of self-reliance, and we now witnessed a maneuver such as pirates had doubtless often practiced in these waters.

Instead of turning our boat seaward, we headed for the shore and on the full of the early morning tide ran the " Estrella " aground. The crew, with the assistance of

negro spongers who, scenting trouble, at once bore down on us, now began to pass the ballast up from below with the energy one would pass water-buckets at a fire, and our decks were soon as littered with old iron as the backyard of a junk shop. When they overflowed, boat-loads of old chains, stones, etc., were sent ashore.

The "Estrella" Aground

As the tide fell the schooner canted more and more to starboard until she lay at a sickening angle. The removal of the ballast now exposed the false bottom and, fortunately, the first plank ripped from it revealed the leak—a hole alongside the keel through which one could shove an arm. Oakum and soap soon stopped it; the plank was replaced, the unwieldy ballast stowed, an anchor run astern and, when the "Estrella" was pulled off the bar at the return of the tide, we all agreed that we had never seen a better day's work.

The following year found me in attendance on the mem-

orable Congress of the American Ornithologists' Union held in San Francisco, and a willing captive to the charms of California bird-life; but a negro member of our expedition of 1902 was dispatched from Nassau to southern Andros to report on the movements of the Flamingos, with a view to facilitating work the following season. He was unsuccessful, and at the end of two seasons' searching, we seemed to have made small progress in discovering the location of the Flamingo stronghold. Communications, however, had been established with the Rev. Mr. Matthews, who had directed us to the abandoned rookery visited in 1902. As the rector of Andros, and one of the twelve white inhabitants in a population of between five and six thousand, Mr. Matthews was in a position to be of great service in continuing the search for Flamingos, and his coöperation proved to be invaluable. At the approach of the 1904 breeding season, acting as the Museum's representative, he sent negroes to search for the Flamingos' nesting ground. It requires an exceptionally courageous native to visit the more remote and almost unknown interior of Andros where, indeed, one might encounter a "Jumby." Only picked men were employed, but one after the other returned unsuccessful, without perhaps having taken too great risks in Jumby Land, until Peter Bannister alone was left to continue the search, and it was owing to his perseverance that the home of the Flamingo was found.

"The Gloria"

Word was at once sent me by vessel, to Nassau, and thence, by cable, to Miami, but in the meantime, accom-

panied by Prof. W. M. Wheeler, I had sailed from the latter place in the schooner "Gloria." Three or four days should have brought us to Mangrove Cay, Mr. Matthews' home, but it was May 8, when we left Florida, and not until May 17, that we anchored off our Bahaman haven. Surely no impatient naturalist was ever confronted with nine days filled with more adverse conditions. Calms, squalls, head winds, deceptive currents, shoals, reefs and coral heads, all fell to our lot, while at one time, at nightfall, when a negro "pilot" ran us hard and fast aground on a lee shore at high tide, the whole expedition seemed threatened with an untimely end. Indeed, subsequent experience in these waters indicated that on this occasion we must have been under the protection of a special Providence. We were without barometer or adequate charts, had no pilot, and not a man aboard the ship had ever been over the route before. Sighting Great Isaac's light at sunset, we continued running all night to the southeast with a fresh northeast wind, in the hope of passing to the northward of the "Josie" (Joulter) Keys. At daybreak land was in sight to the southward but, comparatively speaking, we hadn't much more idea what it was than Columbus had under not dissimilar conditions in these waters, some years before. We, however, could understand the language of the natives and overhauling a sponging sloop whose captain expressed his wonder at "de fly-away ting" bearing down on him, we learned that the land ahead was Red Bay Settlement! In other words, carried to the westward by drift and possibly tide or current, we had gone to the leeward instead of the windward of the Joulter Keys, and were at the northwest, not the northeast end of Andros and apparently would have to put back virtually to the place we had left the preceding evening—an all day's performance. This, in effect, was equivalent to starting again from Miami.

However, when the captain of the sponger learned that we drew only three-and-a-half feet of water with our center

board up, he offered (for two pounds, but accepted two dollars) to pilot us through a passage immediately north of Andros, a route which promised to save us two days; we placed the "Gloria" in his hands with the result before mentioned. We had abundant opportunity the next day to visit the surrounding keys, but, aided by an exceptionally high tide and much work at the capstan by the crew, and various negroes who had been attracted by the mishap, the "Gloria" was drawn inch by inch into deeper water. Among our negro visitors was a gigantic fellow who explained that he was taking his wife and family—he had a boatful of children—on a wedding trip; the marriage ceremony having been deferred somewhat later than is customary.

The following day we reached Nichols Town, near the northeast extremity of Andros. It is attractively situated on high ground, with an abundance of cocoanuts along the shore, and is inhabited by several hundred negroes and one white man, who, hailing from London, seemed somewhat out of his environment. We landed to send mail, and asking a uniformed negro for the postoffice, were conducted to a large, one-room building at the end of which, behind a rather formidable looking desk, sat a yellow gentleman—the resident magistrate, so we learned. He was very dignified, very reserved, very formal and, ignoring our inquiry concerning out-going mail, proceeded to inquire whence and how we had come, and whither we were going. We were from Florida," we answered. "Ah, a foreign country," he observed. Had we "made entry at the Biminis?" "No." "At Nassau?" "No, this was our first port"; whereupon this representative of King Edward, in a voice vibrant with the authority of the whole British Government, said, "Do you know, sirs, that you have committed a great crime?" We expressed our horror and protested our ignorance. What had we done? We had landed on English territory without calling at a duly

accredited port of entry and having our bill of health examined; consequently we were subject to arrest, fine and imprisonment as smugglers and pirates. We explained and apologized and the magisterial authority having been duly asserted, were permitted with a warning to proceed on our way. It was an amusing bit of *opera bouffe* rendered still

Peter

more so when we learned, several weeks later, that our yellow friend had been apprehended for larceny in office.

The weather was now becoming unsettled and we encountered violent squalls which often forced us to come to anchor. Evidently the rainy season was opening. We therefore beat southward inside the reef and four days more brought us finally to Mangrove Cay, where shallow water forced us to anchor about a mile off shore. Mr. Matthews at once identified the strange sail and put off in a

small boat to meet us, but scarcely had he boarded the "Gloria" when we were attacked by a furious cyclonic rainstorm, which, accompanied by violent wind, would have landed us on a neighboring reef had it not been for the seamanship of our captain, who quickly got over three anchors with many fathoms of stout cable. As it was, two spongers collided with us, one afterward going ashore; Mr. Matthews' boat went to the bottom, and Peter, who was off shore in a small boat, was capsized, but thanks to low tide and a friendly bar, was spared to lead us to the Flamingos. For a short time, so suddenly had the storm arisen, the occasion was not without excitement.

The approach of the storm was both beautiful and interesting. One heavy shower was seen advancing from the north, another from the south. As they passed, the one from the north going farther in shore, the great drops of water suggested beaded portieres. Soon after a rotary motion was developed, the pattering drops on the sea chasing one another like figures in a "merry-go-round." The decreasing circle advanced rapidly over the water in our direction, apparently stopping directly above the vessel when a proper perspective for further observation seemed to be wanting.

Six inches of rain fell in two hours, arousing grave doubts for the safety of the Flamingos, whose nests, always placed in the semi-flooded "swash", would, we feared, be flooded by this downpour; but we tried to believe that the storm had not reached that part of the island.

The following morning our voyage was resumed. With Peter calling the course from bow or rigging, we threaded narrow channels and crossed broad flats, when tide and wind permitted and, at the end of three days, (we were now twelve days out from Miami), anchored and in a small boat continued the journey in water too shallow for the schooner. Hours of rowing up endless creeks, flowing through a depressing waste of marl and stubby mangroves, brought

us at last so near the Flamingos' home that we beached the boat and with lowered voices proceeded on foot through the mud and over the sharp coral rock.

The rookery lay just the other side of a "coppet" of bushes and low trees. I approached it with a painful feeling of expectation; was it possible that within a minute or two the vision of years would become a reality? Should I actually see a thousand or more red-feathered forms closely massed in one glowing bed of color, building their nests, incubating their eggs, or even feeding their young?

One whose first knowledge of the glories of Flamingo life is, perhaps, suggested by this narrative, probably cannot fully appreciate the abnormal mental condition of the naturalist whose instinctive desires have been sharpened by years of longing and endeavor; neither, without a true understanding of the situation, could one measure the unfathomable depths of my disappointment when, peering cautiously through the vegetation, I saw only the dreary swash stretching birdless before me.

"You aint see no birds, sir"? replied Peter to my inquiry for the rookery; and his surprise at the absence of the "wastly numerous hos-tes," which he had reported as occupying this place only a week before, almost equaled my discouragement in the face of this overwhelming failure.

Our fears were realized. The deluge of four days before had played havoc with the birds' home. Hundreds of nests were submerged or washed away, and eggs were stranded on mud bars or half buried in oozy marl. The birds had disappeared; it was a scene of utter desolation. In view of the probability that other colonies of Flamingos, if such existed, had suffered similar disaster, it seemed useless to attempt further search in this quarter.

Some work was done while returning to Mangrove Cay. Many Flamingos were seen and painful stalking in marl to the middle resulted in securing what were doubtless the best pictures of Flamingos existing at that time, but they were

too far from those hoped for to afford much satisfaction.

We were now obliged to go to Nassau to replenish our supplies and meet the steamer from New York, on which Dr. B. E. Dahlgren was coming to assist Professor Wheeler in a study of the Andros reef and Mrs. Chapman to take her usual post as my field assistant. In the meantime, Peter was dispatched to the region visited in 1902, and, on returning, our joy may be but faintly imagined when, boarding the schooner during a dark and stormy night, at no small risk, he reported that Flamingos were nesting at this place in unusually large numbers. Being on slightly higher ground, they had apparently not been affected by the storm of May 17.

Wings could not now have borne us to the scene rapidly enough. Professor Wheeler and Dr. Dahlgren were landed at Mangrove Cay to pursue their studies of marine life, while Mrs. Chapman and I set sail for the Flamingos' metropolis.

For the first time since leaving Florida, wind and tide favored us. A distance which, on a former voyage, had consumed four days was now covered in one, and the next morning we reached the nearest point to which the schooner could approach the rookery. Peter's assurance that it was "not too berry far, sir," to the Flamingos, convinced us, in the light of past experiences, that they were distant at least ten miles, possibly more. It was not practicable, therefore, to go and return the same day, and though the frequent rains and tempestuous squalls which must be encountered were not the weather one would select for tent-life, it was evident that we must camp near the rookery.

Without loss of time, our outfit was embarked in the schooner's two boats which, with two of the crew and Peter, we rowed or poled against the wind, and dragged over muddy shoals and marly bars hour after hour, until, though coming from the west, we arrived at an islet of large mangroves, occupied by Reddish Egrets and Louisiana Herons,

which I recognized as a landmark we had reached from the eastern side of the island in 1902. Though no chart showed the route, it was evident, therefore, that Andros could here be crossed from east to west. Still we continued and when after a trying day's work Peter said we were "there," we had no feeling of having arrived anywhere. All day we had been following broad, shallow creeks, which, meeting other creeks, widened at intervals into lagoons, while, on every side, the country spread away into the low, flat swash, neither land nor water and wholly worthless for everything —except Flamingos. So, when Peter announced that our journey was ended, we looked over this hopeless country in search of a camp-site, to find that the narrow, somewhat sandy shore of the creek was the only available place where one might pitch a tent. At the moment, however, we were more concerned about Flamingos than with the details of camping. When for the second time I asked Peter, " But where are the birds?" he replied, "Dere dey are, sir," and pointed across the swash to a thin pink line, distant at least a mile, but showing plainly against the green of the mangroves. Flamingos, surely; but were they nesting? We lost no time in speculation but started at once to investigate. Ten minutes wading through the mud and shallow water, brought us so near the now much enlarged pink streak that, with a glass, the birds could be seen unmistakably seated on their conical nests, and with an utterly indescribable feeling of exultation, we advanced rapidly to view at short range this wonder of wonders in bird-life.

At a distance of about three hundred yards, the wind being from us, toward the birds, we first heard their honking notes of alarm, which increased to a wave of deep sound. Soon the birds began to rise, standing on their nests, facing the wind and waving their black, vermillion-lined wings. As we came a little nearer, in stately fashion the birds began to move; uniformly, like a great body of troops, they stepped slowly forward, pinions waving and trumpets sounding,

"The birds were now all in the air"

and then, when we were still one hundred and fifty yards away, the leaders sprang into the air. File after file of the winged host followed. The very earth seemed to erupt birds, as flaming masses streamed heavenward. It was an appalling sight. One of the boatmen said, it looked "like hell," and the description is apt enough to be set down without impropriety.

"Close-set mud nests each with its single white egg"

The birds were now all in the air. At the time, I should have said that there were at least four thousand of them, but a subsequent census of nests showed that this number should be halved. This was a tense moment. Knowing, through many disappointing experiences, how excessively shy Flamingos are, I feared that even the lately aroused parental instinct might not be sufficient to hold them to their homes and that, after all, I should be denied the fruits of victory—the privilege of studying these birds on their nesting ground. Imagine, then, a relief I cannot describe, when the birds, after flying only a short distance to windward, turned abruptly and with set wings sailed over us, a rushing, fiery cloud, to alight in a lagoon bordering the western edge of the rookery.

Soon we were among the apparently innumerable, close-

"Our tent was stayed to .... one of the boats"

set mud nests each with its single white egg, while two held newly hatched Flamingos! Not only were these the first young Flamingos ever seen in the nest by a naturalist, but their presence was an assurance that this rookery was not composed of the birds whose homes had been flooded by the storm of May 17, but another colony and one which had not suffered a similar catastrophe. I should not therefore have to wait at least three weeks for the eggs to hatch, but had arrived at the most favorable period it would have been possible to select.

While we were standing, half dazed by the whole experience, the army of birds which had gathered in the lagoon rose, and with harsh honkings bore down on us. The action was startling. The birds in close array came toward us without a waver, and for a few moments one might well have believed they were about to attack; but with a mighty

roar of wings and clanging of horns, they passed overhead, turned, and on set wings again shot back to the lagoon.

On every one of the hundreds of occasions when, in fancy, I had entered a city of Flamingos, I had devised some plan for a place of concealment from which the birds might be observed and photographed. Should they occupy

A Composite Picture of Blind and Flamingo City

a site on a flat far from vegetation, similar to that of the abandoned rookery visited in 1902, I had proposed to sink a barrel in the marl, fringing it about with small mangroves; but should the growth be near enough,I had decided to place my umbrella-blind in the bushes. But the sight of the birds over the swash, as we landed, had banished from my mind every thought but the desire to know whether they were nesting; the blind was forgotten, and fearing now to keep them too long from their homes, I erected around a small bush, some thirty feet from the border of the rookery, a shield of branches behind which the blind might be placed the following day.

We now returned to the boats, seeing, with immense sat-

Flamingos Asleep

isfaction, the Flamingos go back to their nests when we were but half across the swash. The claim had been located; it promised nuggets at every step, and our next move was to prepare to work it. I have never camped in a less suitable place, but if we had been beneath hemlocks with a dashing mountain stream at our threshhold, we could not have pitched our tent more cheerfully. At once it was dis-

"With legs and necks fully outstretched"

covered that the sand barely covered the limestone. To drive a tent-pin effectively was out of the question, and our tent was stayed to roots and bushes and to one of the boats, which was hauled ashore to windward, as an anchor for both tent and fly. Incidentally, it proved a capital tank. The daily rains (we had over twenty inches during the month) soon filled it, and beyond a few gallons brought from the schooner, it provided the only and an unlimited supply of fresh water during the eight days we were in camp.

The prospects of the morrow were fatal to sleep, and at

Flamingos Alarmed, Leaving the Rookery

an early hour preparations were made for the second invasion of the rookery. As with blind and cameras we now approached, the birds left their nests with the same orderly sequence of movement shown the preceding afternoon, gathering in a densely massed flock in the lagoon. The blind was quickly set in the place arranged for it, and hung with mangrove branches and palmetto leaves. I entered it and Mrs. Chapman at once started for camp.

"A dozen yellow-eyed birds at my threshold"

This was a moment of supreme interest. Would the birds return to their nests, the nearest of which were about thirty feet from me, or would the blind arouse their suspicions? Twice they rose in a body and swept over the rookery, each time alighting again in the lagoon. It was a reconnoissance in force, with evidently satisfactory results. No signs of danger were detected in the rookery, and, in the absence of ability to count, the retreat of one figure across

the swash was as reassuring as the approach of two figures had been alarming.

Without further delay, the birds returned to their homes. They came on *foot,* a great red cohort, marching steadily toward me. I felt like a spy in an enemy's camp. Might not at least one pair of the nearly four thousand eyes detect something unnatural in the newly grown bush almost within their city gates? No sign of alarm, however, was shown; without confusion, and as if trained to the evolution, the birds advanced with stately tread to their nests. There was a bowing of a forest of slender necks as each bird lightly touched its egg or nest with its bill; then, all talking loudly, they stood up on their nests; the black wings were waved for a moment, and bird after bird dropped forward upon its egg. After a vigorous, wriggling motion, designed evidently to bring the egg into close contact with the skin, the body was still, but the long neck and head were for a time in constant motion, preening, picking material at the base of the nest, dabbling in a near-by puddle, or perhaps drinking from it. Occasionally a bird sparred with one of the three or four neighbors which were within reach, when, bill grasping bill, there ensued a brief and harmless test of strength.

In some instances a bird was seen adding to a nest in which an egg had already been deposited. Standing on the nest, it would drag up mud from the base with its bill, which was then used to press the fresh material into place. The feet were also of service in treading down the soft, marly clay.

The nests at this side of the rookery were below the average in size. Few of them reached a height of eight inches, while nests in the older part of this city of huts measured thirteen inches in height, with a diameter of fourteen inches at the top and twenty-two at the bottom. The depression forming the nest proper was never more than an inch in depth, and was without lining of any kind.

After watching a nesting colony of Flamingos in the Bahamas for "nearly an hour", at a distance of one hundred and fifty yards, Sir Henry Blake stated that the females sat upon the nests while the males stood up together, evidently near by. My dissections, however, showed that both sexes incubate, while continued observation from the tent revealed the presence of only one bird of

The Blind in the Rookery

the pair in the rookery at the same time. The bird on the nest was relieved late in the afternoon and early in the morning. The one, therefore, which incubated during the day, fed at night, and his or her place was taken by another which had been feeding during the day. Or as Peter put it: "I do t'ink, sir, dat when de lady Fillymingo leave de nest, den de gen'leman Fillymingo take her place, sir; yes, sir."

Morning and evening, then, there was much activity in

the rookery. Single birds, or files of as many as fifty, were almost constantly arriving and departing, coming from and radiating to every point of the compass.

Flamingos in flight resemble no other bird known to me. With legs and neck fully outstretched, and the comparatively small wings set half-way between bill and toes, they look

"The birds advanced with stately tread"

as if they might fly backward or forward with equal ease. They progress more rapidly than a Heron, and, when hurried, fly with a singular serpentine motion of the neck and body, as if they were crawling in the air.

As noon approached, the birds disposed themselves for sleep. The long necks were arranged in sundry coils and curves, the heads tucked snugly beneath the feathers of the back, and, for the first time, there was silence in the red city. Suddenly—one could never tell whence it came—the honking alarm-note was given. Instantly, and with remarkable effect, the snake-like necks shot up all over the glowing bed of color before me, transforming it into a writhing mass of

flaming serpents; then, as the alarm-note continued and was taken up by a thousand throats, the birds, like a vast congregation, with dignified precision of movement, gravely arose, pressing their bills into the nests to assist themselves.

Under circumstances of this kind the birds rarely left their nests, and it was difficult to determine the cause of

Photographic Evidence that the Flamingo Does Not "Straddle" the Nest
The birds in the background are sparring

their alarm. Often, doubtless, it was baseless, but at times it was due to a circling Turkey Vulture, the gaunt ogre of Flamingodom, which, in the absence of the parent birds, is said to eat not only eggs but nestlings. Possibly some slight sound from my tent, where, with ill-controlled excitement, I was making photograph after photograph, may have occasioned the deep-voiced, warning *huh-huh-huh.*

I had so often fruitlessly stalked these wary birds across the swash, that I was tempted to step out from my blind and address a word of triumph to the assembled multitude; but so sudden an alarm might not only have caused the destruc-

Newly Hatched Flamingo

Flooded Nests

Showing the necessity of raising the nest above the normal water-level

tion of many eggs, but might have resulted in the birds deserting their homes. Consequently, several hours after entering the blind, Mrs. Chapman, by arrangement, returned; the birds retreated to the lagoon, and I left my hiding place without their being the wiser.

"Swam rapidly away"

Encouraged by this surprisingly successful attempt to study these wary birds at close range, I determined to enter the very heart of the city. Consequently, when, at our approach the following morning, the birds left their nests, the blind was hurriedly moved, from its position at the border of the rookery to a point near its center, where a buttonwood bush afforded it some concealment.

Nests were now within arm's reach; the blind itself covered an abandoned one. It seemed wholly beyond the bounds of probability that the birds would take their places so near me; but, as before, the departure of my assistant was the signal to advance. The great red army with clanging of horns, again approached, reached, and this time surrounded me. I was engulfed in color and clarionings. The wildest imagination could not have conceived of so thrilling an experience. Seated on the deserted nest, I myself seemed to have become a Flamingo.

The blind, strange to say, aroused no suspicion. Without hesitation and with evident recognition of their home, the splendid creatures reoccupied their nests. For a time I feared detection. It was impossible to look from the blind in any direction without seeming to meet the glance of a dozen yellow-eyed birds at my threshold. Fortunately, the uproar of their united voices was so great that the various

sounds made in the manipulation of my two cameras were barely audible even to my ears. With the wind in the right quarter, this honking chorus could be plainly heard at our camp. The adults uttered three distinct calls, all goose-like in character. The usual note of the young bird is a whistling crow.

Brooding and Feeding

The birds of this portion of the rookery had evidently begun to nest at an earlier date than those in the section before visited. Many of the nests contained an egg from which the chick was emerging, and in others were young evidently several days old; while birds which had left the nest were running about with their parents.

On leaving the shell, and before the plumage was dry, some chicks had sufficient strength to respond to their evidently instinctive sense of fear. At my approach they crawled to the edge of the nest and dropped over to the ground or water below, though beyond this they could progress but little. Chicks a day old jumped nimbly from the

Young Flamingo Eating Egg-shell

nest and ran or swam rapidly away. On subsequent days, it became necessary to enter my blind with caution, to avoid frightening the young in the near-by nests. At the best, some would leave their homes and scurry away, but they returned to the place of their birth apparently in response to a call uttered by the parent as it stood on or near the deserted nest. The little chick reached the top of the nest unaided by the parent bird, using its bill, feet, and wings in the effort. The thumb and index finger are both provided with a somewhat recurved nail, which in this connection may be functional. The parents evidently recognized their own offspring, and when a youngster lost his way, his nape was promptly pinched by every old bird within whose reach

he came, a method which was effective in keeping him on the move until he found his own home.

The young stay in the nest until they are three or four days old. During this time they are brooded by the parents, one or the other of which is always in attendance. With a bill as large as their nestling's body, it was of special inter-

Young Flamingo Returning to the Nest

est to observe how the latter would be fed. The operation is admirably shown in the colored frontispiece. What, in effect, is regurgitated clam broth, is taken drop by drop from the tip of the parent's bill. At times the bird, standing above its chick, leans over and feeds it, or while brooding, a snowy head is pushed out from a vermilion wing, and with a swan-like movement the neck is gracefully curved as the food is administered.

This is the young bird's first meal. His next attempts at eating are of special interest. It will be observed that the bill in a newly hatched Flamingo bears small resemblance

"The bill shows first signs of convexity"

"The bird now feeds after the singular manner of the adult"

to the singular, decurved organ of the adult. In the chick the bill is short and straight, with no hint of future curvature; and at this stage of its existence the bird feeds in a manner wholly unlike that employed by the old birds. It *picks up* its food. The second meal, then, consists of bits of the egg-shell whence the chick has lately emerged. This bone-forming matter evidently now takes the place of the *Cerithium* shells which the parents seem to find essential to their well-being.

Young Flamingos Feeding Each Other

When the bird is about three weeks old, the bill first shows signs of convexity, and the bird now feeds after the singular manner of the adult, standing on its head, as it were, the maxilla, or upper half of the bill, being nearly parallel with the ground. Contrary to the rule among birds the lower portion of the bill is immovable, but the upper portion, moving rapidly, forces little jets of water from each side of the base of the bill, washing out the sand and the mud through the strainers with which the sides of the bill

are beset, and leaving the shells on which the bird subsists. Or, as Peter expressed it: "It seems to me, sir, when de Fillymingo feed dat de upper lip do all de wuk, sir, when he *chomp, chomp, chomp,* and grabble in de mud."

Young Flamingos, taken from the rookery for further study, subsequently gave an apparently instinctive exhibit of a characteristic habit of the adult bird when feeding. As I have said, the old birds live on a small spiral shell and its contents. This food is always obtained under water which may reach to the bird's body. When the shells are apparently embedded in the marl, the feeding bird loosens them by a treading motion. It is the Flamingos' one undignified action. Birds thus occupied seem to be engaged in some ridiculous kind of jig, which they dance with the head and neck submerged.

Exactly the same performance was indulged in by the young bird, which, when given a pan of rice and water, soon danced the rice from off the bottom in order that it might be more readily secured.

The routine of camp life was now definitely established. The mornings were passed in the blind, the afternoons in the preparation of specimens, and the evenings were given to the interminable task of refilling plate-holders.

Daily squalls threatened to blow our poorly stayed tent into the creek, and continued rains rapidly decreased the extent of visible land about us. Nevertheless, we were not unduly inconvenienced by the weather.

The Flamingos were less fortunate. The evidently excessive rainfall had flooded even the comparatively high ground on which their rookery was placed. Some nests were submerged, (my own particular nest had already crumbled before the unaccustomed usage to which it had been subjected), and all were surrounded by water. The necessity of erecting a structure of some height was thus plainly demonstrated.

This second catastrophe to a nesting colony emphasized

the adverse climatic conditions with which Flamingos have to contend during the nesting season. Laying but one egg, it is probable that under favorable circumstances they can barely hold their own, and it is therefore to be deplored that man should be numbered among their enemies.

To my regret, our search for Flamingos so widely advertised the location of the rookery among the negroes of the island, that more than a dozen expeditions were planned to visit it for young birds.

Fresh meat is rarer than pink pearls in the outer Bahama islands. Young Flamingos are excellent eating, and are, consequently, much sought after. As a result of this persecution on the nesting-ground, they are steadily diminishing in numbers.

At this time neither they, nor any other Bahaman bird was protected by law, and I take no small pleasure in saying that when this matter was brought to the attention of the proper authorities, an adequate bill was prepared and passed at the next session of the colonial legislature.

Our camp site was now barely habitable, and it became obvious that if the rains continued we should soon be afloat. Confidence in the life-preserving qualities of our pneumatic mattresses, permitted us to sleep undismayed by the *lap, lap,* of waters at our threshold; but more valuable, almost, than life itself, were our photographic plates and specimens, and it was therefore determined to break camp and return to the schooner. In spite of the disagreeable surroundings, the swash was left reluctantly. My work, however, was virtually ended. I had enjoyed an experience unparalleled in the annals of ornithology, had made twelve dozen photographs and pages of detailed notes, and had secured material adequate to represent the home life of Flamingos in a group, to be exhibited in the Museum which had intrusted me with this mission to a little-known country.

THE EGG BIRDS

Throughout the Bahamas the name "Egg-bird" is applied to the Sooty, Bridled, and Noddy Terns. The latter part of April these birds come in large numbers to certain regularly frequented keys to breed. If their resort be near a settlement they are robbed of their eggs by its inhabitants. In Nassau, I have seen many of them offered for sale on the street, each one with the shell punctured as a guarantee that one was not buying a Tern. If they are remote from human habitation, they are generally preyed upon by the cruising spongers to whose scanty bill-of-fare fresh eggs are an eagerly sought addition. Doubtless there are but few colonies of Terns in the Bahamas that do not contribute to the food supply of the usually hungry native, hence the current name Egg-bird. Efforts to secure the passage of a law prohibiting the taking of the eggs of these birds has failed, and, sentiment aside, provided they are permitted to breed and their numbers therefore not decreased, there seems to be no reason why in a country of such limited food products, this source of supply should not be drawn upon.

On May 11, 1902, when the "Estrella" dropped anchor off the Washerwoman Keys, we found that the Egg-birds had evidently been in possession for more than a week, since all three species were incubating their eggs.

After a wide experience in colonies of Common Terns, where every bird is up in the air screaming a harsh protest before you put foot on the island, it was pleasant to be met at our landing-place by groups of Noddies which, with no trace of the nervousness so characteristic of our northern Terns, regarded us calmly almost at arm's length. When they did fly they were comparatively silent uttering infrequently a low reedy *cack, cack,* which at times increased to a rolling, guttural *k-r-r-r-r.*

Bird photography with such willing subjects became as simple as the photographing of nest and eggs alone; while Fuertes found sitters who seemed to appreciate the honor of being immortalized by his pencil.

Noddy Terns

"Regarded us calmly almost at arm's length"

It is the normal habit of the Noddy to build a crude platform-nest of twigs with a few pebbles or shells, on top of the bushes. Many birds on Washerwoman Key had constructed such a dwelling, but by far the greater number laid on the ground under the dense thickets, and built no nest at all.

Possibly the ground-nesting habit is a result of the persecution by negro spongers to which the birds have long been subjected. The birds which nested on top of the bushes were far more likely to be robbed than those which deposited their eggs on the ground on rocks below, and the birds with

Noddy's Nest in a Bush

Noddy Nesting on the Ground

the terrestrial nesting habit have therefore been more successful in perpetuating their kind.

While the extreme tameness of the Noddies is no doubt in part due to their comparative isolation and would probably disappear with increasing contact with man, it is apparently to be attributed more to temperament than to environ-

Sooty Tern on Nest

ment. The Sooty Tern was much shyer than the Noddy, while the Bridled Tern was nearly if not quite as wild as our Common Tern though all three species, so far as man is concerned, are subjected to exactly the same conditions.

The Sooty Terns were more numerous than the Noddies. They invariably laid on the ground, generally under the bushes, making no attempt at nest-building other than a slight hollow in the earth when circumstances permitted. The Sooties were more common at the northern, Noddies at the southern end of the key, where, however, both species nested under the bushes more or less closely associated.

The Sooty's common flight note is a squeaky *quack* and a clearly enunciated, high pitched *ker-wacky-wack.* Nesting birds when disturbed uttered a sharp barking note, changing to a long-drawn, aggressive *squawk,* suggesting the notes of an annoyed brooding hen. Indeed, as one crawled

Noddy in Flight

through the more or less open spaces beneath the bushes with birds protesting or retreating, one seemed to have invaded a densely populated hen-yard.

As the only Tern with a rounded, instead of forked tail, the Noddy might be expected to differ in flight from other members of its family. In fact, it suggested, when in the air, a light-bodied, long-winged, long-tailed Pigeon. They fly rapidly, never hovering with the Sooties, and they were often seen pursuing each other high in the air in what were doubtless mating flights.

Sooty Terns in flight are much like Common Terns and, when alarmed, they have the Common Tern's habit of hanging in the air above their nests. Because of their comparative tameness and of the steadiness of the easterly trade wind, an admirable opportunity was presented to observe these birds in the air at close range. So even was the breeze that the birds, all facing it, seemed to be suspended

and motionless. There was, in truth, but little change in their position, but it was maintained by constant adjustment to the slight variations in the force and direction of the wind. Wings were raised or lowered, widely spread or partly closed; tails depressed or slightly elevated, and fan-like, opened or shut. In short, there was a ceaseless if unconscious effort on the part of the birds to maintain the balance between gravity acting in one direction, and air pressure in another, and so well did they succeed that it was a common sight to see one put its foot through its inner wing-feathers and scratch its ear with as much ease as though it had been on its nest.

Sooty Tern Facing the Trade Wind

Man, taking the Tern as a model, can duplicate its lines and its area of wing expanse to weight, but who will endow his creation of wood, and wire, and canvas with nerves, muscles, and reflexes, which will enable it to encounter automatically and with unfailing precision, the incomparably unstable element in which it is designed to travel?

The Bridled Terns were the least common of the three species on the key in question; but half a mile or more to the south, on a newer key, several hundred were nesting. In general habits they are like the Sooty Tern, but their nest-sites are more commonly beneath a rock or in one of the innumer-

able holes or pockets of the water-worn limestone. In conformance to the law that southern birds lay a smaller number of eggs than northern members of the same family, the Noddy, Sooty, and Bridled Terns each lay but a single egg, while the Common, Forster's Roseate, Arctic, and Least Terns lay three.

The Bridled and Sooty Terns resemble each other so closely (it is difficult to distinguish them in life) that a comparative study of their habits would be of especial interest.

Young Audubon's Shearwater

We, however, were too anxious to continue our search for Flamingos to devote much time to Terns, and our two days in the Washerwoman Keys gave us opportunity for only the most casual inspection of their bird-life.

Large numbers of Audubon's Shearwaters were nesting on this and the neighboring keys, but without the assistance of Mr. Bonhote's Irish setter we should have been unaware of their presence, by day, at least. Toby quickly learned to distinguish the peculiar Shearwater odor, and when the site permitted, dislodgement of the rocks at which he pointed was sure to be followed by the discovery of a Shearwater, either male or female, squatting on its egg or by its downy

young. The birds never attempted to fly, but would run away under the vegetation or into another hole in the rocks. During the day no Shearwaters were seen near the key, though they were not infrequently observed at a distance flying rapidly and scaling low over the water; but at night, when the Terns had become comparatively quiet, the uncanny see-saw cries of the Shearwaters made the keys actually noiser than, when the Terns were not disturbed, they were by day.

Audubon's Shearwater Leaving Nest

THE BOOBY AND THE MAN-O'-WAR BIRD

On March 28, 1907, with Dr. Alfred G. Mayer in command, and George Shiras, 3d., I sailed from Miami for Cay Verde, some thirty miles east of the Ragged Islands, to secure studies and material for a group of the Boobies (*Sula leucogastra*) and Man-o'-War Birds which were reported to breed there. We were aboard the "Physalia," a 56-foot ketch, with a 20-horse-power engine, belonging to the Marine Biological Laboratory of the Carnegie Institution, which Dr. Mayer, the Director of the Laboratory, after establishing a temporary laboratory at Nassau, placed at the disposal of the Museum for the proposed trip.

In reassuring contrast to our equipment on the "Gloria", we now had every desirable chart of the Bahamas, and employed a pilot whenever we entered unknown waters. At sunset we passed through the narrow cut between Gun Cay and Cat Cay and came to anchor for the night. The following morning we got under way at half past three and, using the engine in the face of light head winds, reached the so-called "Northwest Passage" at two o'clock, and dropped anchor in Nassau harbor at midnight. Fortunately we did not know this was to be not only our best, but virtually our only good day's run during the month which our expedition required.

It was ten o'clock the next morning before the health officer of the port, for whom we were obliged to send a messenger, examined our papers and permitted us to land. But in marked contrast to this leisurely way of doing business—which on a former occasion kept us aboard our boat from four in the afternoon until the following morning—the Governor, Sir William Grey-Wilson, promptly consented to grant the permit which, in accordance with the law passed

after the intercession for protection of Flamingos, was now required before the specimens I desired could be taken legally. As a matter of fact, the statute read "the Governor in Council may grant," etc., and we esteemed it a rare example of official courtesy and good judgment, that rather than hold us over Sunday until the Council could be assembled, we were permitted to depart, leaving the permit to be issued in our absence.

The "Physalia"

On March 31, therefore, we left Nassau for Cay Verde, distant two hundred and thirty miles. The air was absolutely calm; the water of mirror-like smoothness and as clear as a lens, revealing, with astonishing distinctness, even grains of sand at a depth of four and five fathoms.

The Bahaman Banks, except at their margins, might be called the deserts of the sea. The water is so shallow that the heavy seas quickly raise what may be termed a sand

storm, which prevents the growth of such forms of life as flourish on the reefs. Hence, the bottom is usually as clean and smooth as a sanded floor. Fish, finding neither food nor hiding-places, are rare, and for the first-named reason, birds are wanting. I have sailed for days over the Banks without seeing so much as a Tern.

After running for forty miles under power, we anchored off Norman Key—where an hour or two ashore resulted in the observation of the common key birds—the Bahaman Mockingbird, Vireo (*V. crassirostris*), and Honey Creeper, which was nesting, together with a singing Catbird (*Galeoscoptes*), a species which was also found in song in Nassau. The beach was marked with tracks, probably of the Yellow-crowned Night Heron, which occurs frequently on even the smallest keys, running about under the dense, scrubby vegetation, more like a Rail than a Heron.

April 1 threatened to end the cruise. Six hours' beating against a strong southwest wind having yielded only eight miles, we came to anchor under Elbers Key, which, although only a few hundred yards long, gave us some protection. The surf on the southern side of the key was magnificent, the now heavy seas striking the jagged limestone as they would a breakwater and throwing white masses of water into the air with the force and effect of a submarine explosion. While congratulating ourselves that we were on the right side of the key, where, in marked contrast, the water met the beach with scarce a ripple, a bank of black clouds began to form at the northern horizon; the south wind dropped suddenly, and over the dark waters at the north, a line of foam was seen advancing so rapidly that in less than ten minutes the surf changed sides, so to speak, and we were now on the wrong side of the key.

To seek shelter from the southern wind, we had gone as near the key as our draught would permit, and this surprising shift placed us almost in the surf. It was evident that the vessel could be saved only by leaving this position at

once, rounding the key, and making out into the open waters to the westward; but no sooner was our anchor raised than, in spite of our engine, the boat was flung toward the key. Fortunately her head swung about and before a second sea could throw us on the rocks, the boat, obeying her helm, veered to the eastward and, after grounding twice, barely missed the southeast extremity of the reef and was in open water. It was a case of what Dr. Mayer aptly described as "touch and go" and extremely bewildering to the mind of a landsman. But, as predicted by my always cheerful friend, Mr. Shiras, "the worst was yet to come."

In order to secure an offing whence we might run before the storm without bringing us up on the line of keys to the eastward—for it was now dark—it was necessary to run some distance to the westward. This brought us into the trough of the sea, where we rolled so violently that the small boat in the leeward davits, dipped enough water to exert a leverage which threatened to place us on our beam ends; fortunately, a wave knocked the boat from its fastenings and it was drawn aboard.

The "Physalia" was now swept by wave after wave, and I recall the expression of one of unusual size which I looked squarely in the face, for what seemed an interminable period. Whether it was of the traditional "mast-head" height I am not prepared to say; for the moment, I was more than content to observe that it was very much higher than my head and beyond that I was concerned wholly with its further movements—was it going or coming? With evident consideration for the Museum's bird groups, it went!

It may be placed to the credit of the "Physalia" and her commander that she finally reached a point where we could turn to the southward; then, stopping the engine, we raised a hand's-breadth of jigger and staysail and ran before the storm. Beyond the not too vague possibility of bringing up on one of the reefs, shoals and keys which lay ahead, we were for the time in no immediate danger; but as the wind

increased in force, reaching, as we afterward learned, a maximum of eighty miles an hour, the sea rose correspondingly, and it required an experienced hand to hold the boat to her course and avoid an upset.

So we wallowed along with the water *sloshing* over everything above decks and below, and with the always enlivening prospect that the black wall ahead might conceal a port for which we had not started; when at midnight it was discovered that the motion of the boat had split the seams of our gasolene tank; the whole vessel was soon filled with the volatile fumes and the dangers of fire became more immediate than those of water. Every light was at once extinguished, even to the binnacle, and deprived thus of the compass by which alone the boat could be held to her course, we were in momentary expectation of capsizing; but a pocket electric torch was produced and by its rays the compass was once more made visible.

This was a long night and the gray light which finally revealed the dark line of keys to the eastward, found a crew whose one desire was to reach a harbor in which they might rest. Under the guidance of the pilot, we therefore headed for the keys and, touching bottom nearly all the way, reached a protected basin which was unanimously declared to be the most attractive place that each man aboard the boat had ever visited. The chart showed that, with only a few square yards of canvas, we had covered ninety miles during the night.

The day was passed in overhauling and drying our outfit and in repairing the gasolene tank which, fortunately, leaked only at the top, and was therefore safe enough in calm weather.

April 3, we resumed our voyage before a still strong, northerly wind, anchoring for the night within the Jamaica Cays, where we rolled heavily under the influence of cross-currents, and, on April 4, reached the excellent little harbor between the Ragged Islands.

We were now within thirty miles of Cay Verde, but the wind having gone to the eastward, was dead ahead, and in Bahamese, there was a " rage on " outside, forcing us to await calmer weather. In the meantime we did some collecting and photographing on Little Ragged Island which, though uninhabited by man, has a population of cows, goats, and chickens, the property of the only white family on Greater Ragged Island, and very curious it was to hear a rooster crow from the depths of a primeval jungle. Birds were not uncommon on Little Ragged Island; a Snowy Egret, six Tree Ducks (*Dendrocygna*) and an apparently undescribed form of the Clapper Rail, of which only one specimen was secured, being the most interesting species recorded.

Conditions appearing favorable, we started for Cay Verde early April 7, but once deprived of the shelter of Ragged Island, the east wind was found to be stronger than we anticipated. Going to windward was not the "Physalia's" strong point, and we were soon forced, therefore, to put about and return to our anchorage. April 8, a second trial was made and the sea being now somewhat lower, with the aid of sails and engine, the Cay was sighted at 3 P. M. still about ten miles to windward. The rate at which we were traveling made it doubtful if we could beat that far before nightfall but, the wind dropping, we lowered our sails and under power alone headed directly for the Cay.

After a nine days trip, not devoid of incident, we approached our goal with no small concern. My information in regard to its bird-life, while the best which could be obtained, was nevertheless about sixteen years old, and was somewhat indefinite as to the date of the birds' presence. When we believed we were near enough to distinguish birds in the air our glasses did not reveal a bird over the Cay nor were any seen flying toward it. But we were further away than we supposed and when, after a period of pretty keen suspense and eager looking, one black dot after

another grew into a gently soaring flock of Man-o'-War Birds and, shortly after, it was discovered that the bushless spaces of the island were dotted with thousands of Boobies and their half-grown young, our elation was to be measured only by the depth of our mental depression when it was believed that the Cay was birdless.

Camp on Cay Verde

The Cay, lying north and south, offered protection for the "Physalia" only from easterly and westerly winds, and as the recurrence of a norther similar to that we had just passed through, would force a run to the southward, Mr. Shiras and I, with a devotion to science sharpened by recent experiences, decided to camp on the Cay, while to Dr. Mayer was left the unenviable duty of staying on the ship. A week's supply of food and water and an awning for a tent were therefore at once landed, while we followed in one of the small boats which was left with us.

By the time our makeshift tent was erected on an oar supported by two camera tripods, and our outfit and provisions placed under its shelter, it was dark. Boobies were

nesting at our threshold, and the rays of our lantern showed them sleeping with heads tucked under the feathers of the back, a seemingly headless parent standing on each side of a generally sitting, headless chick.

During the day a shift in the wind forced the "Physalia" to run around to the east side of the Cay, where, on the night of the 10th, in heavy thunder squalls, she rolled scuppers under. On shore the first rain which had fallen in months caught us when we were least prepared for it. The incident illustrated the difference between the seaman's and the landsman's point of view; Dr. Mayer, on the unstable "Physalia" pitying those "poor devils under a bit of canvas in a deluge," while we, believing a surplus rain-drop or two to be better than the depths of the sea, were congratulating ourselves that we were not aboard the boat.

Cay Verde is about half a mile long, by one-fourth of a mile in greatest width, and roughly estimated, contains some forty acres.

On the west and south or shallow sides, there are steeply shelving beaches, where, under favorable conditions, a landing may be easily made; on the eastern side the deep blue waters of the ocean break directly against the characteristic water-worn limestone rock, of which Cay Verde, in common with other Bahama islands, is composed. At the northern end, where the islet terminates in a point, this rock is but little above sea-level. Southward it gradually increases in height, and with pronounced irregularities in coast line, reaches a bluff-like elevation of seventy-five feet at the southeastern extremity of the islet. About one-eighth of the surface of the island is covered with a dense growth chiefly of sea grape (*Coccolobis uvifera*) but with a liberal mixture, mainly about the borders, of a "prickly pear" cactus (*Opuntia*) and sea lavender (*Tournefortia*).

Where sufficient soil has accumulated, the remainder of the island supports a growth of coarse grasses, sparse on the higher rockier portions, more luxuriant in the lower

portions, particularly about the margins of a small salt pond, the size of which was dependent upon conditions of tide and wind. There is no fresh water on the Cay.

In the literature of ornithology, Cay Verde figures only in Bryant's "List of Birds Seen at the Bahamas from Jan. 20, to May 14, 1859,"* where it is mentioned casually as a breeding place of the Tropic Bird (*Phaethon flavirostris*). This author writes at some length of the nesting habits of the Booby and Man-o'-War Bird as observed in San Domingo Cay and the Ragged Islands, respectively, but does not refer to the colonies of these birds in Cay Verde. Possibly, he did not himself visit Cay Verde where doubtless both the species of birds named have nested for a prolonged period; this Cay, so we were informed, having some ten years ago been the site of a guano industry which flourished until all the available deposit had been removed.

My information in regard to the birds of Cay Verde, was obtained from the late D. P. Ingraham, who, as a collecting naturalist, visited the Cay about 1891. Mr. Ingraham's information in regard to the presence of Boobies and Man-o'-War Birds was fully verified. In May, he also wrote, great numbers of Terns (doubtless *Sterna fuliginosa, S. anæthetus* and *Anous stolidus*) and a few Tropic Birds come to the Cay to nest.

No land birds appear to be resident on Cay Verde, but it is evidently visited by numbers of migrants. During our stay the following species were noted:

Audubon's Shearwater	Fish Hawk
Sooty Tern	Duck Hawk
Great Blue Heron	Kingfisher
Black-necked Stilt	Mangrove Cuckoo
Greater Yellow-leg	Gray Kingbird
Little Yellow-leg	Savanna Sparrow
Least Sandpiper	Myrtle Warbler
Turnstone	Yellow-throat (*Geothlypis*)

Audubon's Shearwater was doubtless breeding on the Cay in some of the innumerable holes in the limestone. No

* *Proc. Bost. Soc. Nat. Hist., VII, p. 102.*

attempt was made to discover it, but the abundance of the birds from nightfall until midnight, as betrayed by their singular calls, together with the absence of other land nearer than thirty miles, leaves little doubt of their presence.

A single Sooty Tern was seen late one afternoon, but numbers of these birds, with possibly also Bridled Terns, were heard flying about the Cay after nightfall. Possibly they may have roosted on the Cay, or their visit may have had some connection with their later occupation of it.

The three duck Hawks living on the Cay apparently found sufficient subsistence in the Shore Birds which visited it and of which they were several times seen in pursuit.

Yellow-crowned Night Heron

The presence of the birds above mentioned, indicates that Cay Verde would be an admirable station for the study of the migration of birds through this region. The small size of the Cay would permit the taking of fairly accurate daily censuses, while the distance from the nearest land makes it the only available stopping place in a large area.

It is to this isolation that the presence of large numbers of breeding birds on the Cay, may be chiefly attributed. Animal food is always at a premium in the Bahamas where indigenous mammalia are virtually absent, and conditions are generally not favorable for the support of domesticated species.

The Bahaman negro considers all flesh edible, and those

bird rookeries which were most accessible, have long ago been devastated for food. The colony containing thousands of Man-o'-War Birds, which Dr. Bryant (*l. c.*) found on Ragged Island, no longer exists; its extinction doubtless being due to the habit, of which we were told, of collecting Man-o'-War Birds, salting them and shipping them as food to the other islands.

As the most abundant and easily observed of the two birds nesting on the Cay, the Booby first commanded our attention.

The Booby Colony

Although the Booby is found throughout the West Indies, northward at least to the mouth of the St. John's River, Florida, where on March 11, 1907, I saw twelve individuals, Bryant appears to be the only naturalist who has recorded an authentic description of its nesting in this region.

A partial census of eggs and young, led to the conclusion that there were about 1500 pairs of Boobies nesting on Cay Verde. They were distributed in several groups where the comparatively level surface and sandy soil furnished favorable nesting conditions. In most instances the young were covered with down, with the brown second plumage more or

less evident in wings and tail. A few birds of the year were already a-wing and several nests contained fresh eggs. For the greater number of birds, however, the nesting season, as Bryant has stated, evidently begins in February.

One or both of the adults remain, as a rule, with the young. On April 9, the birds awoke at 5:15 A. M., when for the ensuing ten or fifteen minutes there was a subdued kind of quacking, and some birds were seen flying. At 5:30 several hundred birds left the rookery in a body to go fishing,

A Call on a Booby Family

this being the general movement. Individuals returned at intervals during the day and evidently changed places with the bird left at the nest, which, in turn, went out to feed and to gather fish for the young.

There was no concerted return movement until dusk, when flocks of birds came in from the sea, the last comers not arriving until after dark. In the meantime, the Man-o'-War Birds had retired and it is not impossible that the Boobies have acquired the habit of "staying out late" to avoid

being robbed of their food by the Man-o'-War Birds, which at times attacked them as they approached the Cay and forced them to disgorge.

Sitting or brooding birds spend the night upon the nest with their mate standing at their side, but the close resemblance of the sexes rendered it impossible to distinguish them at this time. When the young is too large to be brooded, it passes the night on the ground between the two parents who stand on either side, all three with their heads tucked under their scapulars.

"Picked up bits of sticks"

When perched on rocks about the border of the island, Boobies showed a decided fear of man and generally flew before one had approached to within thirty yards of them; but when on their nests they were conspicuously tame, the degree of tameness being related to the advance of the nesting season. A bird with newly hatched young would not, as a rule, leave the nest unless actually forced to do so, and it would strike at one so viciously that it was well not to venture within its reach. This was the extreme development of parental instinct which now gradually diminished as the young increased in size. Evidently as a result of excitement caused by our presence, the birds which remained to defend their young threatened us with their bills, picked up bits of sticks or grasses, only to drop them and pick them up again, and even struck at their own young in a confused and aimless manner. The young also had this habit. The report of a gun occasioned but little alarm among the Boobies, some

of which, with their young near my feet, did not fly when the gun was discharged.

In spite of the apparent sociability expressed by their communal habits, the Boobies immediately resented the trespass on their home site by one of their own kind. Where the nature of the ground permitted, their nests were placed

Booby and Nest

with more or less regularity six to eight feet from one another. As long as a bird remained within its own domain, having a diameter of approximately six to eight feet, it was not molested; but let it or its young advance beyond these limits and they were promptly attacked.

So closely, however, are the birds confined to their own little areas that difficulties of this kind are rare and under normal conditions peace reigns in the rookery. But when, as we walked through the rookery, the birds in escaping from the larger evil forgot the lesser one and inadvertently backed on to a neighbor's territory, the unusual cause of the trespass was not accepted as an excuse and they found the "fry-

ing pan" was worse than the "fire" as the enraged owner, with bristling feathers, furiously assailed them with open bill, sometimes taking hold. At these times, and whenever the birds were alarmed, they gave utterance to hoarse, raucous screams or screeches, though as a rule they were comparatively silent.

Booby Twins

The Boobies' nests on Cay Verde were usually a slight hollow in the ground with often a scanty lining or rim of dried grasses, but in some instances even this humble preparation for housekeeping was lacking and the eggs were laid without pretense of nest.

About ninety-eight per cent of the Boobies nesting on Cay Verde had young, some of which were newly hatched while a few were on the wing, but the largest number were beginning to acquire flight feathers. Thirty-five nests were found containing eggs, of which twenty-one held two eggs, while in fourteen there was but one; but possibly in some, if not most of these, another egg would have been laid. Two eggs, therefore, was the rule, a statement confirming previously recorded observations on the nesting habits of this species. On the other hand, two young was the exception. Of seven hundred and forty nests counted by Dr. Mayer on the east side of the Cay, only two contained two young, and both pairs were well grown and approximately the same size.

Examination of the eggs contained in sets of two showed

A Booby Family

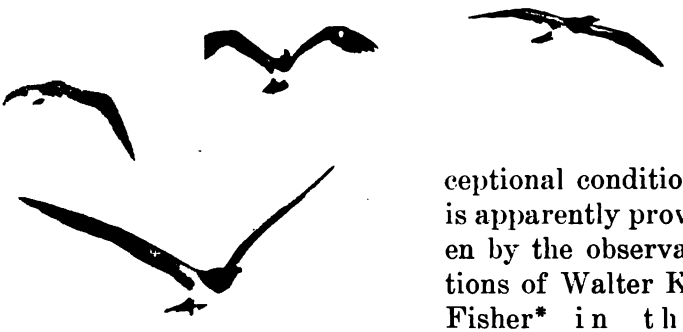
that either there was a marked difference in the development of the embryos or that one or both eggs were infertile. For example, of thirteen nests containing two eggs, in three nests both were bad, in ten both were good but with every good pair there was about a week's difference in the age of the embryo. In six nests each containing one young and one egg, five of the eggs were decomposed.

With those Boobies which lay two eggs, apparently a week intervenes between the deposition of the first and second egg, and to this unusual irregularity in connection with the high percentage of infertility, we attribute the discrepancy between the number of eggs laid and the number of young reared.

Our studies were not sufficiently prolonged to enable us to determine whether, when both eggs were fertile, the young first hatched survived or whether, through continued incubation of the remaining egg it starved and the young

hatched from the last laid egg lived; but in one instance a nest was observed containing a lately hatched dead young and an egg with an embryo.

The case is unique among birds, as far as I am aware, but that the data on Cay Verde do not reveal an exceptional condition is apparently proven by the observations of Walter K. Fisher* in the Leeward Islands of the Hawaiian group where both *Sula cyanops* and *S. leucogastra* were found to lay two eggs and rear but one young.



Boobies in Flight

The young Booby is born naked and since exposure to the sun before the downy plumage is developed would result fatally, it is constantly brooded, one parent at once replacing the other when the brooding bird is relieved. Brooding continues even when the white down is well developed; the young bird is then too large to be wholly covered by the parent, and lies flat on the ground, the head exposed, the eyes closed, apparently dead. This relaxed attitude is also taken by young which are not sheltered by the parent and we were not a little surprised on several occasions, when about to examine an evidently dead bird to have it jump up

* Birds of Laysan and the Leeward Islands, Hawaiian Group, U. S. Fish Comm. Bull.19, 03, pp. 28-30

and with a trumpeting call *blare* at us with open mouth. Nor do they rely only on their voice for defence, but use their bill effectively, and, as has been remarked, they possess with the adult the somewhat ludicrous habit of venting their feelings by picking up bits of stick and grass.

Compared with other rookeries I have visited, the mortality among young Boobies on Cay Verde (aside from the prenatal mortality already referred to) was surprisingly small. This I attribute to the isolation of the Cay which permits the birds to rear their young with little or no intrusion by man, whose presence even only as a visitor, results in great confusion and consequent death among the young of ground-nesting colonial birds.

The young were fed on squids and fishes which in a more or less digested condition they obtained by thrusting their heads and necks down the parent's throat, a manner of feeding common to all the *Steganopodes* with whose habits I am familiar (including Pelicans, Man-o'-War Birds, Cormorants, and Anhingas). I have not, however, seen the Tropic Bird feed its young and it would be interesting to know whether this tern-like member of the order employs a similar method.

Evidently but one brood is reared since approximately three months must elapse after the egg is laid before the young bird can fly and care for itself.

The luxuriant growth of cactus among the sea-grapes in which the Man-o'-War Birds nested, added to the difficulty with which these thickly branched, shrubby trees were penetrated, and we did not attempt to make a census of the number of birds of this species which were breeding on Cay Verde. We estimated, however, that there were between two hundred and three hundred pairs.

The nesting season seemed to be about as far advanced as it was with the Booby, most of the nests containing half-grown young, but some held fresh eggs, while a few birds of the year were already on the wing. Their manner of nesting

prevented us from studying the nesting habits of the Man-o'-War Bird with the ease which attended our observations of the Boobies; and I have but little to record concerning the biography of this species.

The Man-o'-War birds awoke at about the same time as the Boobies, and at 5:30 A. M., were sailing over their rookery. From this time until they retired, considerably before the Boobies, and while it was yet light, a flock of birds was constantly over the sea-grapes. The birds may be said to have perched in the air above their homes. Only one bird is in attendance on the young at the same time. Both sexes as-

A Corner of the Man-o'-War Bird Colony
The blind appears at the left

sumed this duty, as well as the task of incubation; but there appeared to be no regularity as to when male or female should be on guard.

The Man-o'-War birds were less tame than the Boobies and, as a rule, left the nest when one approached to within thirty or forty feet of them. When, however, they were brooding newly hatched chicks, they showed more bravery.

In most instances the gular pouch had faded from car-

Young Man-o'-War Birds on their Nests

mine to orange, and only one individual was seen with the pouch inflated, as Fisher has described it. As I attempted to approach this bird the pouch was suddenly deflated.

The Man-o'-War birds were not seen to devour the young of their own species, as they have been said to do; nor were they observed to capture young Boobies. Occasionally they chased the adult Boobies and made them disgorge in the air, but evidently, in the main, they did their own purveying, flying-fish being taken from one bird that was shot.

The adults were not heard to utter a sound.

The nests were frail, open-worked, slightly hollowed platforms, composed of small sticks and twigs, placed in the

tops of the sea-grapes, at a height of six or seven feet, or among the cactuses within two feet of the ground. Several nests are often placed in one bush within reaching distance of one another. They become matted with filth as the young increase in size. One adult was seen carrying nest-building material in its bill.

Female Man-o'-War Bird and Young

The Man-o'-War Bird lays but one egg, and in a number of nests fresh eggs were found. The young are born naked and are brooded by the parents. As they increase in size and become covered with white down, their wings seem to be much too large for them to hold close to the body, and relaxed, are permitted to rest on the nest. Their whole attitude suggests extreme dejection; not only do the wings droop, but the head often hangs over the edge of the nest. When approached they uttered a squealing, chippering call, and snapped their bills with a rattling sound; both the note and action strongly suggesting similar habits of the young Brown Pelican.

The development of the interscapular feathers in the young Man-o'-War Bird is remarkable. Before there is any evidence of wing or tail feathers, they cover the back like a

mantle, as may be seen in the photographs of young birds in the nest.

It is surprising that in a bird famed for its power of flight, and possessed of exceptional length of wing and tail, the feathers of these parts, contrary to the general rule, should not take the lead in development. Comparison of the young Man-o'-War Birds and young Boobies, for example, in which wing-feathers of the second plumage are just evident, shows that while the former has the whole interscapular region black, some of the feathers being 3.75 inches in length, the Booby shows as yet no signs of second plumage in this region.

Not only are the wing feathers in *Fregata* late in appearing, but the secondaries precede the primaries, the former averaging two inches in length, with the greater and median coverts showing, when the latter is just observable.

Our work finished, we returned to the "Physalia" late on the afternoon of April 12, the change in wind since our landing making it necessary to re-embark from the southern side of the Cay, and at 5 P. M., on the 13th, we reached our old anchorage between the Ragged Islands.

April 13, we replenished our supply of fresh water from a well or seepage-hole within a few yards of the sea, and on the 14th headed for Nassau, but after making eighteen miles, strong head winds forced us to seek shelter and anchor.

April 15, we had made only three miles, when the heavy north wind obliged us to anchor under Nurse Key on which we passed the day. At midnight the wind hauled to the eastward, giving us a lee and permitting us to lay our course. At 6 P. M., on the 16th, we were abreast of Harvey Cay after our only good day's run since leaving Miami, and the barometer promising settled weather, under the advice of the pilot, but against the judgment of our commander, we decided to sail through the night.

The wind held fair but doubtless a tidal current setting

through an opening in the line of keys to the east, carried us from our course and at half-past eleven, after a warning bump or two, we brought up on a bar and were pounded by the sea under a freshening breeze for the rest of the night. Daylight showed that we were on the Cistern Key Shoals and a mile and a half too far to the east.

We had gone ashore at high tide, and the succeeding high tide, at noon, on the 17th, lacked at least a foot of floating us. We did, however, after great exertion, succeed in turning the boat's head so far around that there was some prospect of getting her off the shoals at high water near midnight. In the meantime, cable chains, spare anchors and ballast were thrown overboard on the shoals and buoyed, and our boxes of canned provisions were landed on the nearest key, distant a mile and a half, where, to protect them from negro spongers, I was given the enviable post of guard. The quiet waters of the bay on which I was camped, were dotted with numerous attractive little keys; Mocking-birds were cheerily singing, Doves cooing softly, and the glowing sun sank balloon-shaped into the sea, leaving a sense of restfulness sadly at variance with the anxiety and activity of the day and night just passed.

From the key, the "Physalia" appeared to be afloat and in order that I might determine whether she had moved, I arranged, before retiring, a sight of two conch-shells and a broken limb which, viewed in line, led to the boat. She was not visible from my camp and when at dawn on the following morning I picked my way over the pointed and pitted lime-stone, and found that the "Physalia" was missing from her position at the end of the line connecting the conchs and branch, I held a little celebration which, from all accounts, was not a bad imitation of the one occurring on the boat, when during the night, with unexpected ease, she went off the shoals. A step or two further showed her riding to the wind, in the deeper waters toward the south.

Cargo and ballast were now reloaded with a will and, at

8 A. M., we got under way with a fair wind and every prospect of reaching Nassau in the evening; but when opposite Norman Key, where on March 31 we had anchored in a flat calm, the wind failed, and, being without sufficient gasolene to finish the voyage, the day's run ended at that point. During the night the wind rose, still holding from the south and getting under way at 4:30 A. M., we reached our anchorage in Nassau harbor at noon.

The storm of April 1 had done more or less damage to the shipping here, driving the water up to Bay street and the surf over Hog Island, while a party of tourists were for three days prevented from returning to their steamer, which ran to the southern shore of the island for shelter.

The steamship service to Miami having been arbitrarily discontinued a month in advance of the published sailing dates, and the only available schooner having left the day before, I waited at Nassau until Dr. Mayer closed his branch laboratory and on April 26, continued the journey to Miami aboard the "Physalia." Starting at midnight, we hoped to reach our former anchorage off Cat Cay before dark, but at nightfall, Gun Cay light still being invisible from the masthead, we anchored on the Banks where, in the face of a strong east wind, the boat pitched violently and threatened to snap her anchor chain.

Two hours run, on the morning of April 27, brought us in sight of Gun Cay, but as we were about to slip through the narrow passage between it and Cat Cay, the wind failed and shortly came out ahead. We therefore anchored under Cat Cay. Mr. Haigh, the sociable hermit of this attractive little island, at once came aboard and we not only accepted his cordial invitation to breakfast but virtually became his guests during the two days we waited for a favoring wind with which to cross the stream.

One might hunt far for a more charming place in which to be weather bound. The Cay is about two miles long and, having more soil, is correspondingly more fertile than the

average Bahaman key. Numerous walks which have been opened through the dense growth, facilitate observation of birds, and for this reason, in connection with its geographical position, the Cay would make an admirable place in which to study bird migration.

Great numbers of Warblers were seen here during the two days of our stay, the Cape May Warbler outnumbering all the other species together. There were also Black and White Warblers, Parulas, a single Worm-eating Warbler, Black-throated Blue, Blackpoll and Prairie Warblers, Ovenbirds, Northern Water-Thrushes, Maryland Yellow-throats, and Redstarts, and a single Kirtland's Warbler, the only one I have ever seen, while feeding on the berries of low "sage" bushes, gave me an excellent opportunity to make the acquaintance of this the rarest North American member of its family. Its tail-wagging motion was as pronounced as that of the Palm Warbler.

The wind heading to the northeast, we resumed our journey at 6:30 A. M. on April 29, and after rather a rough trip across the stream, sighted Fowey Rock light at eleven o'clock and reached Miami five hours later—exactly one month and one day from the time we had left there.

I have given the history of this voyage in some detail as in my experience, at least, a rather unusual record of prolonged adverse conditions, and in concluding this narrative of an expedition from which success was virtually choked, I express with much pleasure my indebtedness to Dr. Mayer's skill as a commander, his courtesy as a host, and his value as a scientific associate.

PART V.

THE STORY OF THREE WESTERN BIRD GROUPS

THE PRAIRIE HEN

A GOLDEN EAGLE'S NEST

CACTUS DESERT BIRD-LIFE

Giant Cactus and Santa Catalina Mountains
Note the Woodpecker hole in the main stem

THE STORY OF THREE WESTERN BIRD GROUPS

INTRODUCTORY

For the collecting season of 1906, I planned an itinerary, which beginning in early May in Nebraska, led successively to Arizona, Wyoming, California and Oregon. The work accomplished in the two latter states is described in the chapter on California bird-life, and I wish to relate here briefly the facts connected with the securing of material for a Prairie Hen group in Nebraska, a cactus desert bird-life group near Tucson, and a Golden Eagle group in Wyoming.

I confess that these three chapters are inspired by a desire to present a complete history of the collecting of the "Habitat Groups," rather than by the necessity of recording anything I may have learned of the region, or its birds, in which the three groups were secured. To travel 13,000 miles in three months does not permit one to linger at any one locality and, as soon as the collections were made for one group, we hastened toward the next.

I was accompanied in Nebraska and Arizona by Bruce Horsfall, artist, and J. D. Figgins, of the Museum staff, preparateur. May 1, we reached Lincoln, Nebraska, whither we had gone to confer with Prof. Lawrence Bruner, in regard to a favorable locality for Prairie Hens and to obtain a permit from the State Game Warden to collect the specimens needed.

The same evening, accompanied by Professor Bruner, we left for Halsey, in the sand-hills of the central part of the state, where we became the guests of the Forest Reservation Station.

We left Halsey May 6, going to Denver by way of Alliance, and continuing our journey thence to Pueblo, the

Raton Pass, Albuquerque, and Deming to Tucson, which we reached May 10.

Tucson was left May 21, and Medicine Bow, Wyoming, reached the 25th by way of Yuma, San Bernardino, the Meadow Valley Wash, Salt Lake and Ogden.

A Bates' Hole Road

THE PRAIRIE HEN

That one should have to go to central Nebraska for Prairie Hens is impressive evidence of the rapid decrease of this fine bird. As a boy, in the early seventies, I recall the glut of these Grouse in the butcher shops, my first ornithological collection, indeed, being composed largely of wings of Prairie Hens, obtained with the cook's co-operation. But the farmer in the spring, and the market-hunter in the fall, have given the bird no opportunity to reproduce or time to rest, and it is now either extirpated or rare over most of the region in which it was formerly abundant.

When, therefore, I made inquiry of various correspondents concerning a place where I might count on finding Prairie Hens in numbers, I was advised to go to the sand-hills of Nebraska. In this comparatively arid region, unfit for agriculture except in the watered bottom-lands, the bird proved to be abundant and here, doubtless, it will make its last stand.

Nebraska is a connecting link between the east and the west. Deciduous woods border the streams which flow through the prairies of its eastern portion; conifers grow on the mountains which penetrate the plains of its northwestern portion.

The influence of such striking changes in physiography and forest growth is markedly observable in the distribution of birds in Nebraska.

The eastern Wild Turkey, for example, was once common in the wooded bottom-lands of eastern Nebraska, while the Sage Hen is found on the sage plains of its western border. So, too, among many similar cases, the Whip-poor-will, Chimney Swift, Phœbe, Rose-breasted Grosbeak, and Scarlet Tanager, nest commonly in eastern Nebraska, while

the Poor-will, White-throated Swift, Say's Phœbe, Bullock's Oriole, Black-headed Grosbeak, and Western Tanager, nest only in the western part of the state.

In brief, some eastern birds find their western limit in eastern Nebraska, and some western birds find their eastern limit in western Nebraska, while the ranges of others meet or overlap. The Prairie Hen, for example, extends more than half-way across the state where it meets the Sharp-tail Grouse or Prairie Chicken; the Great-crested Flycatcher meets the Arkansas Kingbird, the Blue Jay the Magpie, to mention a few of many similar cases.

May 3, when we reached Halsey, the migration appeared to be at its height, and many transient species were found with those which were nesting or about to nest.

In or along the swiftly flowing Middle Loup we observed small numbers of Mallards, Pintails, Blue-winged Teal, Great Blue Herons, American Bitterns, Coots, Wilson's Snipe, Solitary Sandpipers and Killdeer. Among the willows and blossom-covered plum bushes of the bottom-lands, were a single Bob-white, Arkansas Flycatchers, Say's Phœbes, Blue Jays, Yellow-headed, Brewer's, and Red-winged Blackbirds (*Agelaius* subsp.), Clay-colored and Intermediate White-crowned Sparrows, Arctic Towhees in great numbers, every plum thicket holding as many as forty or fifty males and females; Field Sparrows, White-rumped Shrikes, and straggling Myrtle, Blackpoll, and Wilson's Warblers, Yellow-throats (*Geothlypis* subsp.), Rock Wrens, Brown Thrashers, and Bluebirds.

On the prairie of the Loup Valley, we saw a single Bartramian Sandpiper or "Upland Plover" once abundant but. as a breeding bird, now very rare in Nebraska, Prairie Hens, Doves, Burrowing Owls, Prairie Horned Larks, Western Meadowlarks, Lark Buntings, Lark Finches, and Vesper Sparrows.

The Sharp-tailed Grouse (*Pediœcetes p. campestris*) appeared to be confined to the dune-like sandhills. In the

air, were Turkey Vultures (we saw two), Ferruginous Rough-legs, Swainson's and Sharp-shinned Hawks, Fish Hawk (one), Barn, Tree, and Bank Swallows.

The list shows that interesting mingling of western and eastern forms which one would expect to find at a locality almost on the one hundredth meridian. The Western Meadowlark was the most abundant as well as the most musical bird present. Its song season was now at its height, and there were few moments from daylight to dusk when one or more birds could not be heard. The flight song was uttered almost as frequently as the perch song. It was always preceded by a mellow, whistled *wheu,* repeated four or five times at increasingly shorter intervals, until it seemed to force the bird into the air to give freer utterance to a hurried, ecstatic, twittering, jumbled warble, as it mounted on fluttering wings to a height of twenty to forty feet, described an arc and sought a new perch.

On the morning of May 5, I saw and heard a single Eastern Meadowlark, whose clean-cut fifing was instantly recognizable in the chorus of bubbling flute-notes of the western bird. The difference in the calls of the species was even more marked than that which exists between their songs. The call-note of the Western Meadowlark is a *chuck, chuck* followed by a wooden, rolling *b-r-r-r-r-r,* wholly unlike the sharp *dzit* or *yert* and metallic twitter of the eastern bird.

Beyond question these two birds meet at the junction of plain and prairie as species, not as geographic races, and the rare intermediates from this part of their common range are, in my opinion, hybrids rather than climatic intergrades.

The morning after our arrival at Halsey, Professor Bruner made good his promise to introduce me to the Prairie Hen and I listened for the first time to their *booming,* with doubtless much the same feeling that an ardent music-lover first hears the voice of a world-renowned

singer. The birds were distant about a mile, but their pervasive, resonant, conch-like notes, came distinctly to the ear through the still, clear air.

After finding the place on the prairie where the birds assembled, I erected there the umbrella blind, putting fresh-leaved willow branches about and over it. The next day the weather proved unfavorable for my purpose, but the morning of May 6, was all one could ask for. I arose at four o'clock; there was no hint of coming day, but a great red moon hung over the sand-hills just long enough to guide me over the mile and a half to the blind. The mercury registered 25°; the grass was crisp with frost, the air sparkling and deliciously stimulating. A Burrowing Owl cackled as I passed his dwelling and from the dark the mellow flute-song of the Western Meadowlark greeted the still unseen day.

A prairie is not overburdened with landmarks at night, and but for the now faint light of the disappearing moon, I should have been unable to find my blind without more direct assistance from the sun. While looking for it I nearly stepped upon a Prairie Hen who, if he was as badly scared as I was, is still talking of the experience. Finally, I found the little structure which seemed singularly homelike, and, no light still paling the east, I crawled within it, prepared to spend a chilly hour while waiting for the curtain to rise, but I had not unslung my camera when, from almost within arm's length, a positively blood-curdling *boom-ah-boom* resounded over the prairie. The performance had begun.

At short range the bird's note suggested the mellow, resonant tone of a kettledrum, and when bird after bird, all still unseen, uttered its truly startling call, the very earth echoed with a continuous roar. Soon one could see as well as hear, and a remarkable sight it was that presented itself. Nineteen cock Prairie Hens were booming, strutting or fighting within one hundred yards of my blind, the nearest being less than half this distance.

As a rule each bird had its own stand separated by about

The Prairie Hen Group
Background painted by Bruce Horsfall; birds mounted by H. C. Denslow

ten yards from that of his neighbor. The boom is apparently a challenge. It is preceded by a little dance in which the bird's feet pat the ground so rapidly as to produce a rolling sound. This cannot be heard at a greater distance than thirty yards. It is immediately followed by the inflation of the great orange air sacks at the side of the neck, which puff out as quickly as a child's toy balloon-whistle; the tail is erect and widely spread, the wings drooped, the neck-tufts are raised straight upward, giving the bird a singularly devilish look, then with a convulsive movement of the lowered head the boom is jerked out and at its conclusion the air sacks have become deflated.

One might imagine that after so violent a performance the bird would feel a certain sense of exhaustion or at least quiescent relief, but his excess of vitality seeks still other outlets. Uttering hen-like calls and cacks he suddenly springs a foot or more straight into the air, whirling about as though he were suffering from a combined attack of epilepsy and St. Vitus dance.

But all this activity is only a prelude to the grand finale of actual combat. Like a strutting Turkey cock, the neighboring birds go toward each other by short little runs, head down, the orange eye-brow expanded and evident, pouch inflated, neck-tufts and tail straight up, and looking like headless birds with two tails. Their meeting is followed by no make-believe duel but an actual clash of wings. Uttering a low, whining note they fight as viciously as game cocks, and the number of feathers left on the ground testifies to effective use of bills and claws.

The first bird called at 4:40, and by seven o'clock the performance was practically over. Either the birds had passed the night out on the prairie or had left their sleeping places in the bushy coverts of the bottom while still it was dark.

It is commonly believed that the performance I have outlined, is for the edification of the females who have been described as interested spectators of the proceedings, but

on this morning not one female was present, and I find that Dr. Anderson ("Birds of Iowa") also states that he has never seen females on these occasions. Probably we may regard these exhibitions as the uncontrollable manifestations of that physical energy which in animals reaches its extreme development during the mating season.

If the female should chance to be a witness of the performance, it may serve to arouse her sexual ardor, but it is evident that her presence is not necessary to stimulate the male to his extraordinary vocal, acrobatic, and war-like exertions.

It is worthy of note that although the Prairie Cock when in the lists is a strikingly conspicuous creature, he wears no adornment which cannot be concealed at a moment's notice. The sight of a passing Hawk changes the grotesque, be-plumed, be-oranged bird into an almost invisible squatting brownish lump, so quickly can the feathers be dropped and air sack deflated. With woodland birds so great a change is unnecessary, but the Prairie Hen can hide only under its own feathers.

With the echoing boom of the Prairie Hen's drum, I can still hear the fluting of the Western Meadowlark, which perched on my blind, and, with almost deafening effect, sang repeatedly, at about six inches from my ear.

A GOLDEN EAGLE'S NEST

It was in 1900 that a correspondent sent me a photograph of a Golden Eagle's nest which, if the birds had consulted the requirements of museum exhibition, could not have been more suitably situated. Foreground and background were so widely separated by an unseen middle distance that the work of the reproducer of the former, and the painter of the latter was clearly defined. Furthermore, the scene as a whole, was not only picturesque in itself, but was characteristic of a type of Wyoming "Badland".

The photograph was filed awaiting an opportunity to make a study of the scene it represented, but this did not come until 1906. On May 25, of that year, I reached Medicine Bow, the nearest railway station to Bates' Hole, fifty miles to the north; the site of the Eagle's nest. Readers of "The Virginian" will recall Owen Wister's description of this town on the Laramie Plains, which, in size and general appearance, has apparently changed but little since the "Judge's" prospective guest alighted there. But the passing of the open range and the advent of sheep have exerted as marked an influence on the life of the place as is implied in the difference between cow-punching and sheep-herding, and Medicine Bow would no longer appeal to the most imaginary romancer.

The ranchman who knew the location of the Eagle's nest, and whose services as guide I hoped to secure, was reported to be seventy miles away; but when my proposition to ride out and find him was met by a suggestion to telephone, I was impressed with the space annihilating properties of this invention as never before, and pardoned the wire-bearing poles for disfiguring the sage-brush.

Within half an hour I learned that my man was absent

on a horse round-up, and thus was saved a fruitless four-day journey. The following day, Will Taylor was secured as substitute, and on May 27, having laid in a supply of provisions at Medicine Bow's only store, we started for Bates' Hole. Two days rain had made the roads very heavy and, after going sixteen miles, we put up for the night at Taylor's ranch. Here in a sheltered valley of the Freeze Out Hills, the man, with infinite labor, had built himself a comfortable home, stable, corral, and other out-buildings, of logs, every one of which he had brought from the Laramie Mountains, forty-five miles away. Fuel he secured from a coal-vein on school land, distant a day's journey. An excellent spring supplied water, and a small bunch of cattle, directly or indirectly furnished food.

It continued raining on the 28th, and the day ended with a violent thunder shower followed by a sudden fall in the temperature, and a stinging hailstorm driven by a howling gale.

May 29, the mercury registered 34° at 7:30 A. M., and the wind blew about fifty miles an hour with occasional flurries of snow and hail. Arid Tucson with its temperature of 103° seemed to belong to the experience of another year rather than of the preceding week.

In the afternoon, with the hope of finding that the high winds had partially dried the roads, we decided to start on our journey. A canvas top stretched over our wagon transformed it into a prairie schooner, which gave us excellent protection from the wind and hail. Toward evening the clouds broke into great masses and the day ended with a magnificent sunset and a promise of a clear morrow.

We put up for the night at Dyer's ranch unexpected, but unmistakably welcome guests. A broncho "buster" with a string of fifty horses, who had also stopped here for a night's lodging, gave us an exhibition of riding which would have done credit to a Cheyene tournament.

May 30, the wind was high but the air clear and exhila-

rating. Our schooner with Taylor's sturdy horses and a saddle horse as tender, was under way at 7:30 and we were soon launched in a sea of sage-brush bounded ahead only by the snow-ridged Laramie Mountains, forty miles away. The Muddy River was bankfull, but we forded it with a rush, and early in the afternoon reached the edge of the great depression in which, somewhere, was the object of our search.

In Bates' Hole

The wind still blew violently, and it was necessary to find a camp-site which would give us some protection from its force. The trail through the bottom of the Hole proved impassable and, after a narrow escape from miring, we were forced to turn to the left and in a mile or more, discovered the cabin of a settler named Groener, so hidden in a pocket on the shores of Stinking Creek, that we might have passed it unseen within a hundred feet.

We pitched our tent in the lee of the cabin—which Mrs. Chapman was the second woman to enter—and gladly

accepted Groener's invitation to use his stove and firewood.

Bates' Hole is a basin in the plains, some sixty miles long and about one hundred to one hundred and fifty feet below the general level of the surrounding country. The bottom is mainly covered with sage-brush, which is largely "sheeped out", or grazed to the wood, the Hole being a favored resort of sheep, particularly during the winter and in May, when lambing. There were several "lambing outfits", with their gypsy-like camp wagons, in the Hole at the time of our visit.

The walls or sides of the Hole are of Miocene clay deeply seamed by gulches with out-jutting headlands curiously weathered into castellated buttes.

In one of these buttes was the site of the nest we had come to find. We had no map and without the service of the guide on whose assistance we had counted, the search seemed rather hopeless. But the excellent series of photographs and the instructions sent by my original correspondent, soon enabled us to locate our position and the day after our arrival the nest was found within three hours of our camp. It was not occupied, but this was not essential to the accomplishment of our purpose. The site was photographed, specimens of the soft clay-rock collected, and Mr. Hittel, the artist, made studies on which to base his painting of the background. Later, a new Eagle's nest was secured in the Freeze Out Hills and introduced into the group on the reproduced Bates' Hole site.

June 2, we left Bates' Hole and on the 5th took the train at Medicine Bow for California.

This trip offered no opportunity for detailed bird study, but I add some notes on certain of the birds observed.

It was interesting to find that the little patches of Douglass Spruce which appeared on the sides of Bates' Hole wherever there was the proper amount of moisture, were large enough to hold a few forest-haunting birds; Audubon's Warblers, Long-tailed Chickadees, Flycatchers

The Golden Eagle's Nest

(*Empidonax*) and Arctic Bluebirds being seen in the spruce islet which appears in the foreground of the Eagle's nest picture.

In the willows bordering Stinking Creek, a pair of Magpies had a nest, and a MacGillivray Warbler sang its strongly accented song of seven notes from the shelter of a similar growth at our camp. Here, too, were a few Yellow Warblers and Mountain Song Sparrows. A Catbird and

female Bobolink seen at this camp seemed strangely out of place in the sage-brush.

A small slough at Taylor's Ranch was occupied by a pair of Pintails and a pair of Shovellers. One morning a female Wilson's Phalarope dropped into it to feed eagerly, gracefully, with quick turns of the head to right or left and half dives, but without wholly submerging the body.

These birds, however, were as local and incidental as their own special haunts, and the characteristic birds of the region were the common inhabitants of the plains, the Mountain Plover, Sage Hen, Mourning Dove, Burrowing Owl, Shore Lark, Brewer's Blackbird, Western Meadowlark, Chestnut-collared Longspur, Western Vesper Sparrow, Lark Bunting, and Sage Thrasher.

Other species were noted but these were the character-giving birds, the ones almost constantly seen or heard as we drove through the sage-brush.

To one who associates Plover with the sea-shore, or even grassy prairies, the Mountain, or as it might better be called, Plains Plover, seemed singularly out of place amid the sage-brush. It was locally common and by no means shy. It shares with others of its family, all the pretty Plover-like tricks and mannerisms of rapid running, graceful movements of the head, and dainty folding of uplifted wings. It is not a noisy bird like the Killdeer, and I did not often hear what is evidently its song; a hoarse croak uttered several times as the bird with outstretched wings floated to the earth from a height of fifteen or twenty feet.

As I feared, the courtship of the Sage Hens was past, and no opportunity was offered to observe the remarkable mating habits of this great bird. The females were sitting and already the males were gathered in small flocks which were very difficult to approach. Two nests were found, but both had been raided and the eggs destroyed, presumably by coyotes.

CACTUS DESERT BIRD-LIFE

The great cactus-covered deserts, so characteristic of the more arid portions of Mexico, push a well-developed arm northward into Arizona, where it forms too marked a feature of North American scenery to be omitted from any series of representations designed to include at least the more pronounced types of our landscape.

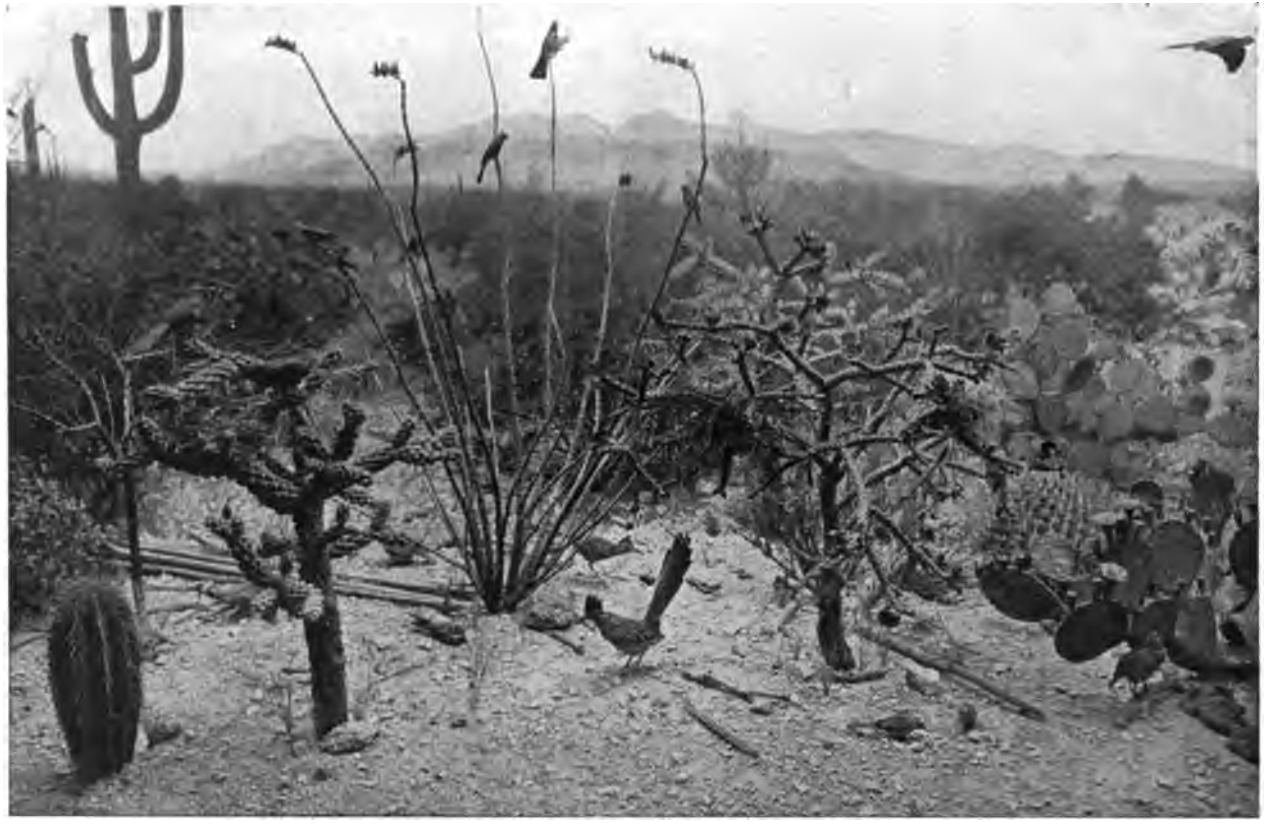
Since this region has no colonies of birds, and no one bird of sufficient size to be treated alone in a group, it was decided to prepare a group which should show its commoner birds as well as its commoner forms of vegetation.

Tucson, the site of the Desert Botanical Laboratory of the Carnegie Institution, was selected as a suitable locality for our labors, throughout which we had the invaluable advice of Dr. D. T. MacDougal, the Director of the Laboratory.

We were fortunate in finding, the morning after our arrival, on May 9, a tent-house completely furnished, from a shower-bath to a can-opener. The preparateur of our party was at once appropriately installed as cook, with the artist as assistant, while the ornithologist acted in an advisory capacity. We were served daily by the butcher and baker, and even the iceman, and in addition to all these conveniences and material comforts, we were surrounded by many birds and plants we had come to study.

From our home on a hillside, about a mile west of Tucson, we had a grand view of the Santa Cruz Valley with irrigated alfalfa fields in the foreground, the city in the middle distance, and the beautifully modelled Santa Catalina Mountains on the horizon.

The desert vegetation was at its best, and, looking out over a sea of variously colored and luxuriant blossoms, it



The Cactus Desert Group
Background painted by Bruce Horsfall; vegetation prepared by J. D. Figgins; birds mounted by H. C. Denslow

was difficult to believe that we were not in a land of great fertility.

The palo verdes (*Parkinsonia*) were covered with such a profusion of yellow flowers that they gave a yellow tone to the landscape. The scarlet blossoms of the well-named candle bush (*Fouquieria*), at the end of their slender, spiny and generally leafless branches, gleamed like little tongues of fire. The great leaves of the wide-branching, prickly pear cactus (*Opuntia engelmanni*) were often fringed with large, pale yellow blossoms which, toward evening, became a delicate shade of buff. A cylindrical-leaved cactus of the same genus (*O. versicolor*) developed a confusing tangle of intricate growing branches, and a correspondingly large number of yellow, mahogany, and scarlet flowers. *Opuntia spinosior* bore magenta blossoms, while those of *Opuntia cholla* were pink, but, unlike the two species first mentioned, neither was in full bloom.

To eastern eyes, the giant cactus (*Cereus giganteus*) was the most striking type of plant-life. The drier, more rocky slopes were, in places, thickly grown with its candelabra-like forms, some of which attained a height of forty feet. The white, waxy, tubular flowers appeared in a cluster at the end of the branches, where they opened toward the sun. As virtually the only form of vegetation suitable for hole-nesting birds, this cactus is possessed of an especial interest to the ornithologist. Few specimens of any size are without one or more Woodpecker's holes; the Gilded Flicker being apparently so dependent on this kind of nesting-site that is not found where the giant cactus is absent. The Elf Owl also is known to nest only in this cactus, using the old Woodpecker holes. Several species of birds, notably the White-winged Dove, were seen apparently probing the *Cereus* flowers, but just what they obtained I did not learn.

Except along the "washes", where mesquite grew abundantly, there was no shade; no murmuring of leaves. The rigid, thorny vegetation was rendered attractive only

by the peculiarity of its form and the beauty of its blossoms.

During the ten days of our stay, the mercury ranged from 48 degrees at 5 A. M., to 103 degrees in the early afternoon; going below 60 degrees and over 90 degrees daily. But in spite of the fact that our tent was poorly adapted for this kind of weather, we suffered but little from the heat. It was the surprising dryness of the climate which most impressed us. No matter how violent the exertion it was impossible to perspire. Even draught horses did not wet a hair, and a ridge of salt on their coat bore testimony to the rapidity of evaporation. We were almost constantly thirsty and consumed quantities of water, never leaving camp without a filled canteen.

Judged from its inflorescence, vegetation was at the height of its spring development, closely corresponding, indeed, to conditions at the same season near New York City; but considered from only an ornithological standpoint, the season was more advanced. The song of some birds had evidently waned. The Cactus Wrens had already reared one brood, only one nest, among scores seen, containing young; and many nests of Palmer's Thrasher contained young nearly ready to fly. I regretted not hearing this species at the height of its season of spring song, for it is evidently a musician of exceptional gifts.

Experience leads us to expect Wrens to be highly musical, when, judged from its size, the Cactus Wren would rank first among the many sweet singers of its family, but its repertoire appears to be limited to harsh, scolding notes, and one is attracted only by the trimness of its appearance, the vigor of its actions, and its ability as a nest-builder.

Both Thrasher and Wren almost invariably placed their nests in *Opuntia cholla,* the most spiny of the cactuses and, with the Thrasher particularly, it was difficult to understand how the bird went to and from its home without becoming impaled.

These two birds were abundant near our camp where

other characteristic species were Gambel's Partridge, Mourning and White-winged Doves, Turkey Vulture, Western Red-tail, Roadrunner, Golden-fronted Woodpecker, Gilded and Red-shafted Flickers, Poor-will (*Phalænoptilus* subsp.), Texas Nighthawk, Arizona Crested Flycatcher, Scott's Oriole, House Finch, Desert Black-throated Sparrow, Arizona Cardinal, White-rumped Shrike, Cañon Wren, Verdin and Plumbeous Gnatcatcher.

Palmer's Thrasher Approaching Nest in Cholla

The Texas Nighthawk seemed more like a Whip-poor-will than Nighthawk. Its food-flight was comparatively short and rarely twenty feet above the ground. Even less nighthawk-like were its singular, murmuring, humming notes, like the sound of winnowing wings.

An intimate study of the home-life of the Roadrunner,

Palmer's Thrasher Cleansing Nest in Cholla

could not fail to develop facts of unusual interest, and I searched long but unsuccessfully for a nest of this bird of pronounced characteristics. The mounted birds in the photograph of the group, illustrate very well its appearance in motion and at rest. The bird in the background, with lowered head and horizontal tail, is running as only a Roadrunner can; while the one in the foreground represents a pose assumed when the bird's body stops and the tail appears to go on.

The Roadrunner is not usually credited with much vocal ability, but at times it mounts to a low perch and, with tail drooped like a Thrasher's, utters a low, moaning, pervasive

coo. A chittering note, possibly of alarm, is produced by a rapid striking of the mandibles.

From May 14 to 17, we camped at the mouth of Pima Cañon, in the Santa Catalina Mountains, about twelve miles from Tucson. After crossing the sandy bed of the Santa Cruz Valley, where the creosote bush (*Covillea*) now covered with innumerable little downy, white seed-balls, was

Mourning Dove Nesting in Cholla

the prevailing plant, we ascended the rocky mesa where the various species of cactus grow more luxuriantly than we had found them in the vicinity of Tucson. Birds, too, were more abundant and we added a number of species to the list of those observed about the city.

About a mile above our camp, excellent water could still be found in a stream flowing through and over the rocks in the bottom of the cañon, and this proved a source of attraction to many species of birds.

Morning and evening an almost continuous flight of Mourning and White-winged Doves passed our camp in going from the desert to the water, up the cañon and back

again. Both birds nested commonly in the dense growth on the mesa; the Mourning Doves in the cholla, the White-winged in the palo verde, and the soft cooing of the former and vigorous, *cookeree, cookeree, coo-ree-coo, cook-coo, ree-coo, cook-coo, ree-coo* were among the commonest bird notes about our camp.

As we lay rolled in our blankets, in the early morning, Gambel's Partridges crowed from the near-by bushes or chattered conversationally, as with nodding crests they ran gracefully about us. Cardinals and Cañon Wrens whistled, Cactus Wrens scolded and, occasionally there was an outburst of Thrasher or Mockingbird music.

Less welcome neighbors were the little striped skunks which at night frolicked about the camp and rummaged among our provisions, without our daring to resent their familiarity.

The Gila monster was also an inhabitant of the cañon; the artist brought one to our camp in his umbrella, but it refused to partake of our hospitality and escaped during the night.

One evening, when the cañon was in shadow and the sun still illumined the mountain tops, a coyote, following the wind, ran up the bed of the stream, almost reaching me before he seemed aware of my presence. Then he leaped lightly up the steep slope. Twice he paused and whined anxiously, then bounded behind a rock and disappeared; a pitiful, gaunt, worn, seemingly homeless creature.

The making of this cactus desert group called for unlimited skill and patience on the part of the preparateur. Every joint of cactus it contains is a facsimile reproduction of the original, and is made from a mould.

Before making casts of each section of an *Opuntia* or of the small *Cereus* appearing at the left of the group and the larger barrel cactus (*Echinocactus*) at the right, it was necessary to remove carefully, one at a time, every one of the hundreds of spines with which they are covered. After the

cast had been taken from the mould (the species of *Opuntia* in wax, the others in plaster) they were colored from our field studies of growing plants, and the spines were then replaced—an almost endless task.

Doubtless the best comment on the measure of success attained in this work was furnished by a member of the Botanical Laboratory staff who, after inspecting the finished group with the utmost care, declared his inability to determine whether the plants were real or not!

Barrel Cactus

PART VI.

BIRD STUDIES IN CALIFORNIA.

THE COASTAL MOUNTAINS AT PIRU

THE COAST AT MONTEREY

THE FARALLONES

THE SAN JOAQUIN VALLEY AT LOS BANOS

LOWER KLAMATH LAKE

THE SIERRAS

Redwoods in the Armstrong Grove
Sonoma County, July 14, 1906

BIRD STUDIES IN CALIFORNIA

INTRODUCTORY

It is impossible to speak of California descriptively without using superlatives. If not the largest state in the Union it is at least the longest; 770 miles separating its northern and southern boundaries; it has the highest mountain (Mt. Whitney, alt. 14,501 ft.) and the greatest depression (Salton Sink, 287 ft. below sea level). It has a rainfall as low and nearly as high, as that of any other part of the Union.

Owing, therefore, to its great extent, its diversified topography and its extremes of temperature and of aridity and humidity, California is a land of perpetual snow and endless summer; of barren deserts and luxuriant forests; of wide-stretching plains and majestic mountains; of expansive marshes and bold, rocky, islet-beset coast-lines.

In consequence of these widely varying climatic and physiographic conditions, California is admirably fitted to support an exceptionally rich fauna. Among birds, some five hundred species and subspecies, or nearly one-half the number known from America north of Mexico, have been recorded from this single state.

However, it is not only to the favorable conditions just outlined, but also to its geographical position that California owes its abounding bird-life. The mountains which enter it from the north form an effective pathway for the extension southward of many boreal species; while at its southern border, both mountains and deserts have proved gateways through which have entered species from temperate as well as from tropical Mexico.

The Great Basin, which encroaches on California's eastern frontier, gives to it such characteristic interior species

as the Sage Hen and American Magpie. On the western boundary of the state, an extended coast-line adds a large number of aquatic species to its list of birds, many of which find suitable nesting places on the numerous islands off the coast.

California, therefore, has not only been given an unusually large share of the world's assets in bird-life, but she has made the most of her resources. In the absence of glaciers, except at high altitudes, the climate of the state has not suffered those changes which have so profoundly affected the fauna of the once ice-covered areas farther east. The most distinct, and possibly therefore some of the oldest types of American land birds still exist in California. The Wren-Tit, for example, which is practically restricted to the state, is the only North American bird for which an independent family has been suggested. Furthermore, in addition to the preservation of these older types, California has made birds of her own. In no other part of America, possibly in no other part of the world, have widely varying climatic influences, aided by sharply defined physiographic areas, so strongly impressed themselves on a fauna. East of the Rockies, where comparatively uniform conditions prevail, there is, for example, only one well-marked form of the Song Sparrow; but in California there are fourteen. Non-migratory, and inhabiting alike dry and moist regions, plains and mountains, marshes and outlying islands, the species readily responds to these strikingly different environments. This is only one case among many, not alone with birds, but with lower as well as higher types of life, and ethnologists tell us that more linguistic stocks have been developed among the Indians of California, than in all the rest of the country.

Broadly speaking, the leading physiographic areas of California, from east to west, are the eastern desert, the Sierras, the interior valley, the coastal mountains and the coast.

The eastern desert area, in the southeastern part of the state, is composed mainly of the Colorado and Mohave deserts and extends from two-thirds to three-fourths the way across the state, being bounded on the west by detached desert mountain ranges. This is an area of excessive aridity with, in places, an annual rainfall of not more than two inches. Northward, the desert area, now the western margin of the Great Basin, becomes a narrow strip at the foot of the Sierras, but at its northern extreme, broadens to nearly half the width of the state.

The Sierras form a wall from 70 to 100 miles wide and about 500 miles long on the eastern side of the state, extending from Lassen Peak in the north to Tejon Pass on the south. From the sun-scorched deserts at the east, or more fertile valleys at the west, they rise through a succession of forest growths to alpine meadows and snow-covered summits, with correspondingly wide diversity in bird-life.

The Sierras mark the eastern boundary of California's great interior valley, which is enclosed on the west by the Coast Range. This—the Sacramento Valley at the north and San Joaquin Valley at the south—is a, generally speaking, level area some 500 miles long, and averaging 40 miles wide. It is devoted to grain and grazing. The interior valley is bounded on the west by the Coast Range, which extends from the Santa Barbara region northward the whole length of the state, with a conspicuous break at San Francisco Bay. Heavily forested in its northern portion, it is comparatively arid south of Pacific Grove and, in the dry summer season, its golden brown hill-slopes are one of the characteristic features of the state's scenery. By no means so high as the Sierras, the Coast Range mountains do not reach above the timberline and no alpine birds are found in them.

To the west of the Coast Range, lies the coastal strip of valleys and hills, parallel to the mountains. In northern California, where the land temperature is lower than the sea

temperature, the prevailing, moisture-laden, westerly air currents are condensed, with a resulting heavy rainfall, (60 to 80 inches annually), and a consequent luxuriant forest growth. This is the region of the redwoods. In southern California, while the prevailing winds are still off the ocean, they meet a usually higher land temperature; condensation rarely follows and the rainfall averages only from 10 to 20 inches annually.

Finally, there are the islands off the coast. On the larger ones, between twenty and thirty species of land birds have been found nesting. In many instances, as a result of insular isolation, they have become sufficiently changed from the mainland stock to be described as new races or species. The smaller islands, some of which are mere rocks, are often the home of great gatherings of sea-birds.

My own experience in this great territory, so roughly outlined, was gained between the dates May 12 and July 4, 1903; June 8 and July 18, 1906. Obviously this is too limited a period to permit me to speak with authority of the bird-life of any part of California. I have, however, seen enough of the state to be impressed by the opportunities it offers to the ornithologist; and it is this impression, together with some appreciation of California's manifold attractions for the nature lover, to which it is hoped this sketch will give form.

THE ENTRANCE TO THE STATE

Whether naturalist or tourist, one should enter California through its deserts, from Arizona; reserving the Sierras as a climax to his journey through the state.

If traveling on the Southern Pacific railway, a stop may be made at Yuma, on the Arizona side of the Colorado River. I have never visited a more barren place. The creosote bush was almost the only vegetation on the mesa, and this grew sparsely, while an occasional Shore Lark was the only bird seen on a morning's outing.

In the willows of the river bottom, birds are more com-

mon, among them being numbers of Desert Song Sparrows, which, with haunts not unlike those our Eastern Song Sparrow often frequents, is still the palest form among some twenty races of this plastic species; evidently it owes its colors to the direct action of the aridity of its environment, and not to a natural selection which has brought it into a fancied harmony with its immediate surroundings.

Tree Yuccas at Hesperia

To the westward one should pause on the borders of the lately formed and now disappearing Salton Sea, in which White Pelicans have taken possession of an island; or, still farther west, to observe the effects of irrigation on bird as well as plant-life of the Imperial Valley. The desert range is here crossed through the San Gorgonio Pass, where the rush of wind from the Pacific to the heated deserts creates a sand-blast from which the telegraph poles must be protected.

If the Santa Fé route be selected, the tourist should stop at the Needles on the Colorado River. West of the Needles, one should see the tree yuccas of the Mohave Desert. Our American Ornithologists' Union party passed the morning of May 12, 1903, among them, at Hesperia.

Even a few hours amid distinctly novel surroundings is sometimes sufficient to impress one with their salient features, and the bristling yuccas, often topped by Cactus Wrens, the abundance of flowers and birds, the distant snow-ridged San Bernardino Mountains, still stand clear-cut in my memory.

Such an experience prepares one to realize the effects of irrigation which are encountered, after journeying through the Cajon Pass, about San Bernadino, Redlands and Riverside, with their beautiful gardens, extensive orange groves, eucalyptus and pepper-bordered avenues, vocal with the songs of innumerable birds, chiefly Goldfinches, (*Spinus psaltria*) and Linnets, (*Carpodacus mexicanus frontalis*).

The visiting ornithologist now has an inviting field before him. Possibly he could not do better than to settle down for a time in the vicinity of Los Angeles where the proximity of sea and mountain will enable him to cover readily a widely diversified territory. My only field work in this part of the state was pursued somewhat farther north, near Piru.

THE COASTAL MOUNTAINS AT PIRU

Piru is situated in the eastern part of Ventura County, somewhat over fifty miles by air-line from Santa Barbara. I visited this region from June 14 to 20, 1906, to examine the site of a California Condor's nest from which, two years before, a young bird had been taken for the zoological garden at Washington. The bird had been secured by a ranchman named Whittaker, a man of varied interests. In the Piru Valley he raised oranges and apricots; sixteen miles up Piru Creek at its junction with the Agua Blanca, he had a bee ranch, where the occupants of hundreds of hives were daily adding 700 pounds of honey to his and their resources; six or eight miles further up the Agua Blanca, at an altitude of about 1500 feet, in the Devil's Potrero, he had established a thrifty looking apple orchard which had yielded prize fruit.

Whittaker gracefully accepted the office of guide which our unexpected appearance imposed upon him. He supplied a team, assisted in the selection of provisions, added a liberal supply of oranges, which we picked off his trees, and drove us up the Piru to the bee ranch, crossing and recrossing the flood-swept creek bottom, and winding through the scrub-covered grazing land, where an occasional Road Runner was seen.

Late in the afternoon, we reached a picturesque little cabin, almost hidden in the great live oaks; as charming a home as though it had been prepared for our coming. The Agua Blanca, clear as its name implies, flowed rapidly past our door to join the more turbid Piru a hundred yards beyond. All about were the rounded mountain tops. The place was alive with birds. One pair of Linnets had a nest in the house and another had built on a canteen hanging beneath

Piru Cañon
The site of the Condor's nest is above the horseman

the porch At daybreak one morning, a coyote was seen gathering scraps at our door step, but I watched in vain for a repetition of the visit.

The site of the Condor's nest was distant five miles up the Piru. We reached it on horseback the next morning, following the stream all the way; now on narrow paths worn in the steep banks, now over and around great boulders, now in the bed of the creek itself, where we had several confidence shaking experiences with quicksand.

Gold was first found in California on the Piru, and the creek has had its share of the romance and tragedy of min-

ing; such events as came within Whittaker's experience he recounted to us, as an abandoned claim, deserted cabin, or thicket-grown grave stirred his memory.

The Condor's home was in a narrow cañon with walls some 200 feet in height, of conglomerate rock, polished by the rush of waters at the base of the cañon, like mosaic. The birds had lived—they build no nest —in a cave some 50 feet from the top of the cañon and 150 feet from the bottom. This they had occupied for a number of years and probably would have been nesting there now if the inevitable "man with a rifle" had not tested his gun on one of the pair. Doubtless he considered the shot successful and the bird was left where it fell; to be carried away later by high water. While I was climbing up the more sloping wall of the cañon to photograph the cave-entrance, a pair of Condors, the first I had ever seen in nature, swept majestically overhead, near enough to impress me not only with their great size, but with their personality. We hoped that they might prove to be in possession of the old nest-site, but they soon passed out of view over an adjoining mountain and were seen no more.

The following day, Mr. Hittell returned to the cañon to complete his sketch, braving the quicksands of the Piru unaccompanied, while Mrs. Chapman and I, under the leadership of Whittaker, went up the Agua Blanca to see the site of a second Condor's nest. This proved to be a small cave, about 100 feet from the top of a vertical cliff some 500 feet in height. The surroundings being far less susceptible of treatment in group form than the Piru cañon site, no attempt was made to examine this nest, and we continued our journey to the ranch in the Devil's Potrero.

The country was wilder than that visited the preceding day, the trail rougher, and on reaching an exceptionally picturesque cañon, known as the Devil's Gate, we dismounted to clamber over the rocks, while Whittaker led the horses a mile or more around through the woods.

I was interested to find here hundreds of chattering White-throated Swifts. Many were nesting in holes in the walls of the cañon, some near the top, at a height of 150 feet, others almost within reach.

Leaving the Potrero

Once through the Devil's Gate—which leads to a far more beautiful country than its name would imply—we left the sparkling Agua Blanca to follow Potrero Creek through a narrow gorge densely grown with live-oaks and luxuriant ferns, up a trail so steep that the horses often paused to breathe, and in half an hour we reached the Potrero itself, a wooded valley enclosed by mountains on every side but the one through which we had entered.

Here the great live-oaks sheltered another cabin, all furnished and ready for occupation, when once we dispos-

sessed the mice, spiders and sundry other tenants. Potrero Creek sprang from a bubbling spring in the valley and formed a small pond before the cabin in which, like Barn Swallows, the White-throated Swifts bathed; at dusk the Poor-wills called from its shores, and at night an Owl hooted from the oaks overhead. Its voice resembled that of the Barred Owl but was higher and, in place of two long notes followed by two short ones, the first and fourth notes were long, the second and third short. I supposed it to be the Spotted Owl, (*Strix occidentalis*), the only one I have ever heard.

Arkansas Kingbirds, Ash-throated Flycatchers, Western Wood Pewees, Western Flycatchers, (young leaving the nest), Arizona Hooded Orioles, House Finches or Linnets, Arkansas Goldfinches, Heermann's Song Sparrows, Black-headed Grosbeaks, Spurred and Anthony's Towhees, Lazuli Buntings, Western Tanagers, Hutton's, Swainson's and Cassin's Vireos, Phainopeplas, Yellow, and Black-throated Gray Warblers, (feeding young), Vigor's and Parkman's Wrens, Western Gnatcatchers and Western Bluebirds were the common birds of the valley, and in the cañons Dotted Cañon Wrens were numerous and Rock Wrens not infrequent.

Our stay in the Potrero was made memorable not only by the seclusion of our camp and charm of its surroundings, with its abounding bird-life, but by the daily sight of the great Condors in which I was especially interested. On the afternoon of our arrival, no less than seven of the splendid birds were in view at one time, sailing high above the mountains. They were readily identified by their white under wing-coverts; but when they were too far away, or too low for this conspicuous character to be discerned I could not distinguish them, with certainty, from Turkey Vultures unless they chanced to be associated with that species, when they could at once be known by their larger size. When the two were seen flying together, the Condor appeared to be

more stately in its movements. It did not veer so often, or trim its sails to the wind as the Vulture does; but, carrying more ballast, was steadier in the air. The Condor's tail is evidently shorter than the Vulture's, but in other respects the birds looked much alike. When perched in the same tree the Condor seemed to be fully three times larger than its less distinguished relative.

Turkey Vultures and Burro

A burro of Whittaker's, which chanced to die at this time, was exposed on a hill-top overlooking the valley, with a hope that it might attract the Condors. For three mornings I watched it from a very carefully concealed blind, but although the Condors evidently saw the feast, they were too wary to partake of it. I awaited some evidence of their interest in the bait before going to the blind, which was already in position; but the burro had been dead nearly forty-eight hours before the Condors were attracted to it. After a prolonged reconnoisance, during which it

sailed low over the cabin many times, giving us an excellent opportunity to admire its sweep of wing, a Condor finally perched in a dead tree near the carcass. Assured that I had now only to hide in the blind to secure short-range studies of it, I climbed to the hill-top; but on my appearance the bird at once took flight and with at least two others, which were circling overhead, disappeared. This was at 9:30 A. M. and although I waited for six hours, it did not return.

The two following days, I entered the blind before daybreak, but the place seemed to possess no further attraction for the Condors. That the birds are not always so shy, however, has been emphatically shown by Mr. W. L. Finley's studies of a pair which at this same season were nesting near Pasadena, some fifty miles away. (The Century, Vol. LXVV, 1908, p. 370; The Condor, Vols. VIII, X.)

The Turkey Vultures about the Potrero were less suspicious than the Condors; but to one accustomed to their semi-domesticated condition in many of the towns of our southern states, it was not a little surprising to find that here, where they did not look to man for their food, they entertained a marked fear of him.

The day after the burro's death, about twenty Turkey Vultures gathered in the dead tree near the animal's body and occasionally flew over it, but without once alighting. The following day, when the Condors appeared, six or eight Vultures were perched on the burro, but, with the Condor, they flew at my approach, and not a Vulture returned that day. Even when I had concealed myself in the blind before they were a-wing, they showed extreme caution in coming to the carcass. The first rays of the sun touched the brown, oak-dotted hillside at 4:50, and ten minutes later the earliest Vulture was seen; but although the repast must have been tempting, an hour and a half passed before they ventured to come to it. During this period, they sailed to and fro, cautiously inspecting the surroundings, or perched in the dead tree near by. Nothing about the blind could pos-

sibly have alarmed them, and their actions were evidently due to pure wariness.

One morning, just as the sun flooded the distant hills with mellow light, a pair of pointed ears were seen erected over the burro's gray hide and, a moment later, a coyote's head appeared from below the hillcrest. Coming up the wind, his nose led him to a tempting breakfast; but mingled with the appetizing odors was one to be feared. He licked his lips wistfully; then discretion got the better of hunger, and turning, he disappeared down the hill.

THE COAST AT MONTEREY

A variety of causes has made Monterey famous among students of Pacific Coast bird-life. Monterey Bay, a broad arm of the sea, is at certain seasons frequented by many kinds of water birds, including such pelagic species as the Short-tailed Albatross, Fulmars, and Shearwaters. Pond-dotted marshes with inflowing streams, meadows, deciduous woodlands, suggestive of a more eastern landscape, and a forest of Monterey pines, also help to induce the presence of a large and varied avifauna.

The pine forest is a distinctive feature of the land immediately bordering the sea; in places, great dunes of gleaming white sand being blown into the edge of the woods.

The success of this coniferous growth is due to the low average summer temperature, occasioned by the prevalence of fogs at that season. To the same cause may be attributed the nesting here of many species which one would not expect to find breeding at sea-level in this latitude. Among them are forms of Steller's Jay (*Cyanocitta stelleri carbonacea*); White-crowned Sparrow (*Zonotrichia leucophrys gambeli*); Thurber's or Sierra Junco, (*Junco hyemalis pinosus*); Chestnut-backed Chickadee, (*Penthestes rufescens barlowi*); a west coast representative of the Hudsonian Chickadee; Winter Wren, (*Troglodytes hiemalis pacificus*); Olive-backed Thrush, (*Hylocichla ustulata*) and Hermit Thrush, (*Hylocichla guttata sleveni.*)

At Pacific Grove, a mile beyond Monterey station, one may hire a tent-house virtually in the pine forest, a large tract of which is preserved by a local land company. The student of birds with a field glass and camera, will therefore find awaiting him an attractively situated camp and exceptionally favorable conditions under which to pursue his investigations.

Although the fauna was quite new to us, Louis Fuertes and I saw some forty species of land birds in and about these woods on May 27 and 28, 1903. All were apparently summer resident birds except a flock of ten Cedar Waxwings, seen on the 28th, and a single Clarke's Crow, satisfactorily identified at short range on the 27th.

Among the water birds, Heermann's, Bonaparte's, and Western Gulls, and Brandt's Cormorants were the most

"All the quiet bodies of water contained Phalaropes"

abundant about the rocky shores of Monterey Bay. On the coast, we found a few Snowy Plovers and Wandering Tattlers, and on May 29, a pair of Harlequin Ducks was seen by Fuertes at Point Lobos.

We were especially interested in the Northern, and Red Phalaropes which chanced to be abnormally abundant at this time. When we reached Pacific Grove, on May 20, a record-breaking northwest wind had been blowing for more than two weeks. It evidently had rendered navigation impossible for the Phalaropes, and these seafarers among

the Snipe, while voyaging to their Arctic summer homes, had encountered the gale and been stranded in vast numbers. A week later, we found many wrecks of this feathered fleet ashore on the Farallones, where their poor, emaciated little bodies were floating in the rock-enclosed pools left by the tide.

I had previously seen this bird only on the Atlantic, resting in great beds on the waters or rising in silvery, curling

Northern Phalarope Whirling

waves before the approach of our steamer. While I regretted the disaster which had befallen the half-starved little waifs, I realized that their ill luck was my good fortune, and lost no time in availing myself of this unusual opportunity to make the acquaintance of a bird which but few naturalists have met intimately.

All the quiet bodies of water contained Phalaropes, a large pond in the city of Monterey being fairly speckled

with them. As, with several members of our American Ornithologists' Union party, I approached its margin, I was not a little astonished to observe that apparently one-half of the Phalaropes in it were spinning about in the most remarkable manner. They might have been automatic teetotums.

Northern Phalarope Swimming
Note the feeding-place, just abandoned, at the left

The sight of this singular action aroused vague memories of a description of it as a courtship ceremonial. It will be remembered that marital relations among the Phalaropes are somewhat unusual. Not only is the female larger and more brightly colored than the male, but she *is* the male in all but the prime essentials of sex. She woos, selects the nesting site, and, while of necessity she lays the eggs, the male, unaided, hatches them and rears the resulting family.

These facts suggest that a careful study of the mating habits of Phalaropes will throw much needed light on the problem of sexual selection, and, exulting at the possibilities of the situation, I concealed myself in an overhanging limb which swept the water. The nearest birds were now within ten feet. The larger size and brighter plumage of the females was strikingly noticeable and no difficulty would therefore be experienced in determining the part in the performance taken by both sexes.

At once the alleged forwardness of the female was dis-

counted by seeing quite as many males as females pirouetting; while the sight of single birds, of either sex, whirling around quite alone, cast doubt on the sexual significance of the evolution.

Brandt's Cormorants Gathering Grass

In short, it required only a few moments' watching to learn that the revolving birds were feeding. The lobed feet were moved alternately in such a manner that the birds spun around in the same spot, making a complete revolution in about two seconds and from three or four to as many as forty turns without stopping. A rotary movement of the shallow water was thus created, bringing to the surface small forms of aquatic life which the Phalaropes eagerly devoured, their slender bills darting rapidly two or three times during each revolution. It was an interesting and, in my experience, a novel method of securing food.

Off the coast near Monterey, are a number of rocky islets, some of which are inhabited by Brandt's Cormorants. An island of this character not far off shore above Cypress Point, is one of the features of the "Seventeen Mile Drive". There are similar islands at Point Lobos, about six miles further south. We attempted to land on them on May 29, but were prevented by the surf.

Cormorant Rocks near Point Lobos

The Cormorants were now gathering grass for their nests, from an island almost within a stone's throw of the mainland. They appeared, as a rule, from the south, alighted at the edge of the island, a cliff some thirty feet in height, waddled awkwardly to the unclipped grass, pulled a bill-full, waddled back to the cliff-border, threw themselves into the air on outstretched wings and, flying toward the north, returned to their nesting rock which was immediately back of the one on which they were "haying".

Throughout the day, feathered mowers were rarely absent from the field, sometimes as many as nine birds being present. The denuded area from which the grass had been removed, was as bare and as sharply-defined from that portion of the crop which the Cormorants had not yet gathered, as though it had been mowed and raked by a human harvester.

On June 9, a second attempt was made to land on the Cormorant rock here but, like the first, it failed. The birds now had eggs.

Brandt's Cormorant

THE FARALLONES

Bird inhabited rocks are characteristic of the California coast. Tourists will recall one off the Cliff House at San Francisco, as well as the one at Cypress Point, near Monterey. But California's famous bird islands are the Farallones, which are not only the largest in the state, but in the Union.

To the visiting ornithologist, this avian metropolis is the strongest attraction of our Pacific Coast. Distant only thirty miles from San Francisco, it may be reached by tug in three or four hours of as uncomfortable sailing as one is likely to encounter in a life time at sea.

Excellent lodging is to be obtained with the keeper of the Farallone Light, or his assistants, who give even the unexpected visitor that unmistakably cordial, eager welcome one generally receives where guests are infrequent.

The Farallones have an extended history. Discovered by Ferelo in 1543, they were first described by Sir Francis Drake in 1579, and, not to mention a number of less important articles, have been the basis of papers by Emerson (1888; 1903), Barlow (1898), Loomis (1896), and Ray (1904). But these descriptions, as well as verbal accounts, and pictures had poorly prepared me to realize the beauty of the islands and the marvel of their bird-life.

One is first impressed with the size of the islands; in place of a mere rock inhabited by birds, because it is not habitable by man, one finds an island nearly a mile long with an area of about 100 acres. A coast line of extreme irregularity, set with great masses of detached rock or bordering islets, and an unusually diversified surface, not only adds to the charm and interest of the island but materially increase its apparent dimensions.

Hills—mountains, almost they seem—caves, amphi-

theatres, plains, ridges, crests, arches, domes and pinnacles give a constantly varying character to one's surroundings. If the Farallones were birdless, they would still compel the enthusiastic admiration of every lover of the ruggedly picturesque and elemental.

The surf completes the grandeur of the scene. Even on

The Landing-place

calm days, the ocean hurls itself with terrific force against the unprotected rock. How it surges into the caverns, bellowing from their darkened depths! How the waves charge through the arches to meet a fellow from the other side and bound into the air as though a mine had exploded beneath them! How they shoot up, geyser-like, from crevices in the rock, open below to the sea!

There is a singular, human character to the Farallone surf; and when from the green wall of in-rushing water,

large, expressive eyes set in a great head, look one squarely in the face, it is easier to believe the creature the embodiment of the sea than a sea-lion from the rookery on a neighboring islet.

Telephoto of Murres on a Near-by Islet

Ten species of sea birds and a single species of land bird nest upon the Farallones, but the number of individuals by which they are represented, no one has ventured to estimate.

The California Murre, is the most numerous inhabitant of this marine aviary and about this bird centers the history of the Farallones as egg-yielding islands.

Among San Francisco bakers, Murres' eggs are considered an acceptable substitute for the product of the poultry yard, and as early as 1849, they were sold in San Francisco markets. At this period of insufficient food-supply, they brought one dollar per dozen. In 1854, it is stated by

Dr. W. O. Ayres, more than five hundred thousand eggs were collected in the Farallones in less than two months; but in 1896, according to L. M. Loomis, the number had dropped to ninety-odd thousand and the price to twelve and a half cents per dozen.

Murres

"Thousands lived in the wave-washed caverns"

Under the more systematic method of collecting, employed at the later date, the comparatively small number of eggs then secured doubtless only in part indicates the decrease in Farallone bird-life which had occurred in forty years. To prevent further decimation of this bird colony, the United States Government, at the solicitation of the

American Ornithologists' Union, has fortunately forbidden egg-collecting on the Farallones.

When undisturbed, Murres perch on the rocks with their dark backs toward the sea, a fact well illustrated by the telephoto of a Murre-covered pinnacle, made at so great a distance that the birds were not alarmed. One does not realize at first, therefore, the astounding abundance of these birds.

They were especially numerous on the less accessible cliffs and pinnacles, and on the islets off-shore they were often so thickly massed that a new comer could with difficulty find a foothold. Thousands lived in the wave-washed caverns where, when alarmed, their white breasts gleamed like lights in the gloom; a queer little cave people, bobbing and bowing and muttering in a tongue of their own.

When one appeared at the entrance of their subterranean home, there was a rush for the outer world. Some birds flew past one, through the air, and the wise man gave them free passage; others flew below one, under the water, where the action of their wings could be plainly seen.

Wards of the Government, the Farallone Murres might be envied among birds, were it not for the presence in their nesting resort of the Western Gull, a species closely allied to our common Herring, or Harbor Gull.

Never have I seen more relentless, brazen, destructive enemies of bird-life than these immaculate, snowy-breasted, pearl-backed birds. Second in number only to the Murres, they were especially abundant at the western end of the island, where, when walking, a great band of cackling Gulls always hung over one, waiting to dart down on the eggs of Murres or Cormorants, from which the owners flew as we approached. The nests of a large colony of Brandt's Cormorants were quickly emptied of their contents in this manner, the apparently famished Gulls dashing into nests almost at one's feet. The greenish eggs of Murres are not so conspicuous as the white Cormorant eggs and, being laid

in less exposed situations, are not always discovered by the keen-eyed robbers. Many, however, are taken and a light-plumaged Gull with a large, brightly-colored Murre's egg in his bill, dodging hither and thither in the attempt to escape a crowd of envious comrades, forms a stirring picture of bird-life. One might observe it with more satisfaction, however, if the pursuers were of the same species as the egg.

The victimized Murre, doubtless, takes small interest in the results of the chase. A stolen egg is irreparably lost; prevention is the only cure; consequently when not dis-

"A great band of cackling Gulls always hung over one"

turbed by man, Murres are close sitters, one or the other of the pair always covering the egg.

Without man to play the spaniel, the Gulls are forced to get their booty by patient watching for the moment when an egg may be left unguarded or, in some instances, even by

force, when they actually attempt to take the egg from beneath the body of the sitting bird.

All about the island, one may see these daintily-clad creatures, wearing pinions fit for an angel's wings, perched near some incubating Murre, ready to take advantage of half a chance to snatch the egg which, for widely different reasons, they both value so highly.

Western Gull on Nest

Whether the Gulls were always near starvation or whether Murres' eggs are an especially delectable dainty, one cannot say; but, in view of the Gulls' insatiable appetite for fare of this kind, it was surprising to observe that they did not prey upon their own kind. I recall no better instance in bird-life of "honor among thieves."

During the days of "egging" on the Farallones, the men engaged in this questionable industry recognized the Gulls

as their only rivals, and destroyed their eggs and young. But the prevailing conditions afford protection for the Murres and Murres' enemies alike. Evidently even among birds, a solicitous Government cannot extend protection only to those who need it. Law for the Murre is law for the Gull; and the Farallone Gulls' Trust now enjoys a monopoly of Farallone egg products, which those concerned in the passage of the law never intended it should have.

Telephoto of Brandt's Cormorants

Notwithstanding the fact that it is most frequently robbed by the Gulls, Brandt's Cormorant is by far the most abundant of the three species of Cormorants which breed upon the Farallones. Building in exposed situations, it left its nest when I was so far away that satisfactory pictures of it could be secured only with a telephoto, and the Gulls were given abundant opportunity to make a clean sweep of the unguarded eggs. Both Baird's and the Farallone Cor-

morant nested among the rocks; and both had young. The former were usually on the face of cliffs, and being much less shy than Brandt's they were comparatively secure from the ever-watchful, marauding Gulls.

Nor can one explain why the Guillemots and Puffins, which lay their eggs in burrows or crevices in the rocks, quite beyond the Gulls' reach, should be so much less

Guillemots

abundant than the Murres. The Guillemot, furthermore, lays two eggs to the Murres' one. To be less abundant than Murres, however, is far from approaching rarity. In fact never have I seen Guillemots so numerous as they were on the Farallones. Groups of from ten to twenty of these plump, so-called "Sea Pigeons" gathered in sunny places on the rocks, where, some reclining, some standing, they permitted a near enough approach to enable one to see defi-

nitely their greenish-black plumage, with its snowy-white wing patches, and their coral-red feet; so often do they open their mouths to emit a high, squealing whistle, that its coral-red lining constitutes a by no means unimportant part of their make-up.

But it is to the Tufted Puffin that the prize for originality in costume must be awarded among Farallone birds. Parrot-like in appearance, he adds to the attractiveness of red feet, a surprisingly large, bright red and yellow bill, and from the side of each white cheek springs a streaming plume of straw-colored feathers.

Tufted Puffins

The Puffin lives in burrows or holes under the rocks where, if one would learn the strength of its singularly shaped bill, one need only to insert one's hand!

Murres, Gulls, Cormorants, Guillemots, and Puffins, form the diurnal sea-bird life of the Farallones. But abundant as they are, one has only to go out of doors after dark to believe that birds are as numerous by night as they are by day. Then, Cassin's Auklet, Leach's and the Ashy Petrel come from their retreats in holes, cracks, and crevices in the rocks and similar places. The air is filled with their weird and elfin cries. The first night on the island, I was awakened by a startling scream, "Come here; come here", apparently at my bedside; but it proved to be

Cassin's Auklet in Crevice in the Rocks

a Cassin's Auklet, beginning his evening hymn in his home under the floor of my room. The second night he seemed to change his tune to a piercing "Let me go; let me go." It required no small amount of self-persuasion to believe that this unearthly sound was a bird's voice and consequently interesting if not altogether desirable.

No such effort was needed to welcome the notes of the Rock Wren, the one resident land bird of the Farallones. Against a background of the Murres' harsh squawks and guttural groans, of Gulls' screams and cackles, of Guillemots' shrill whistles, its mockingbird-like song stood out with peculiar charm and sweetness, as the unconscious little musician hopped calmly from rock to rock among its strange companions, apparently as much at home as though it were in the quiet seclusion of a Sierra cañon.

I have spoken of the Wren as the only land bird of the Farallones. At present, I understand this to be true; but at the time of my visit, a pair of Ravens lived about Arch

Rock where the never-failing supply of Murres' eggs must have induced the belief that they had indeed reached the Seventh Heaven of ravendom.

Like the Ravens, other birds, particularly such as migrate by sea, sometimes touch at the Farallones. I saw several Black Turnstones and again encountered wrecks of the Phalarope fleet so many members of which had gone ashore at Monterey.

Although so much has been written about Farallone bird-life, I am convinced that an unexpectedly rich reward awaits the student, who, going to the islands in May, when the birds come, and remaining until they depart, in August or September, will devote himself to a study of their life histories and relationships. The three days of my visit (June 3-6, 1903), were barely sufficient to give that vitalizing touch of personal experience, which renders so much more intelligible anything we may have heard concerning a locality and stimulates our interest in its subsequent history. Moreover, at this time, the birds were less tame than they become later in the season and could not be readily observed and photographed.

Rock Wren

THE SAN JOAQUIN VALLEY AT LOS BANOS

On the afternoon of May 22, 1903, when, with Louis Fuertes and H. Ward, as guide, I left Oakland for Los Banos, great billowy cataracts of fog were pouring over the hills about Tamalpais; but within an hour we found a different climate. In place of the damp, raw air of the coast, the atmosphere was clear and dry. Instead of the densely wooded mountains north of the Golden Gate we were shortly passing over level plains, through seemingly endless fields of wheat. Such sudden and marked changes are frequent in California.

At ten o'clock that night we reached the village of Los Banos, The surrounding country is comparatively arid and large tracts have been irrigated to grow alfalfa and, particularly, to create grazing for the cattle of the Miller and Lux Company.

In irrigating for grazing, the waters of the San Joaquin river are used literally to flood vast areas, and the desert is soon transformed into a series of creeks, ponds and marshes. The desert plants are replaced by *Sagittaria* and *Ranunculus,* tulés (*Scirpus*) and cat-tails, (*Typha*), and the desert birds by a remarkable assemblage of water birds whose local distribution is governed by the presence or absence of water. On reaching Los Banos, our inquiry, therefore, was not for birds but for water, and we directed our steps, or to be exact, those of our horses, toward that portion of the ranch which we learned was then being irrigated.

Driving over a levee, which extended as far as the eye could see, we observed that the old and the new bird life was separated only by the width of the dike. On the left was a parched and sterile plain, with Horned Larks and Burrowing Owls; the home also, of jack rabbits, coyotes, and rattle-

snakes; on the right were fertility and water, with Ducks, Herons, Ibis, Terns, Coots, Stilts, Avocets, and other aquatic species in countless numbers.

To the east, the view stretched across the desert toward the distant Sierras where, on clear days, could be seen the snow-fields which, eighty miles away, supplied the water at our feet. To the west, one looked over green marshes and shining ponds, dotted with cattle and fairly twinkling with flitting wings, to yellow fields leading up through moulded brown foot-hills to the blue crests of the Coast Range.

Burrowing Owl

The place combined in an unusual way, the attractions of both a desert and a marsh, without the drawbacks of either. There were no mosquitoes or other noxious insects, no dust or thirst-creating aridity and, in spite of a comparatively high temperature, the air was dry and invigorating. The conditions were so favorable for mirage, that, after several surprising experiences, we lost confidence in every feature of the landscape which was beyond reach. Passing trains, at a distance of a few hundred yards, appeared to be fused, shimmering bodies, travelling through the air, while the most beautiful ponds and patches of tulés and cat-tails faded at our approach.

However, our immediate surroundings were always so interesting that we were not inconvenienced by these illus-

ions. Except upon bird islands, I have never seen birds more abundant than they were in this desert-marsh. The group, a photograph of which is reproduced herewith, was based on our studies, and is by no means over-done. It is true that one would not find all the birds it contains, in a space twenty by eight feet, but one could frequently see them all in a single glance, and the impression of the group seeks to convey is therefore within the truth.

Among the species seen daily, most of them in large numbers, were the Cinnamon Teal, Mallard, Pintail, Redhead, Fulvous Tree Duck, Great Blue Heron, Night Heron, American Bittern, Forster's and the Black Tern, Coot, White-faced Glossy Ibis, Killdeer, Avocet and Black-necked Stilt. Twelve Wilson's Phalaropes, a species which had previously been recorded from west of the Sierras but once, were also added to our list.

Of all these birds, the Stilts, because of their abundance, vociferousness, and remarkable actions were the most conspicuous and interesting. They nested on the little islands formed by slightly elevated bits of ground, often selecting a site which, under irrigation, subsequently became submerged—a misfortune artificial conditions had not prepared the birds to anticipate.

On May 23, their eggs were hatching, and in June the snipe-like young were widely distributed over the marsh. They invariably attempted to escape observation by squatting with neck outstretched, but the parents, whether one approached their eggs or young, expressed their solicitude by a surprising extravagance of motion, all apparently designed to draw attention to themselves. I was at times surrounded by hopping, fluttering Stilts, all calling loudly, waving their wings, bounding into the air to hang there with dangling legs and beating pinions, and executing other feats which would have done credit to acrobatic marionettes.

The Avocets were scarcely less demonstrative, but their method of defending their eggs or young was less by the

strategy of actions to make themselves the centre of attraction, than by the most reckless attempts to drive the intruder from the field. Rapidly uttering their loud *plee-eek*, they charged one with a directness and apparent determination which threatened to drive their needle-pointed bill into the base, swerving to right or left when only a few feet away, and repeating the performance almost immediately. They

Stilt on Nest

claimed dominion over so wide a territory and appeared so anxious to guard it all equally, that it was difficult to locate their nest from their actions. We found neither eggs nor young on our first visit, but several nearly grown young were taken between June 16 and 20.

Black Terns were as abundant over this submerged desert as Swallows are over some of our eastern marshes in August. There was not a moment when their sharp *peek* could not be heard. They nested on their usual little island-rafts, and the young of the year were just beginning to fly on June 16.

Forster's Terns were far less common than their smaller, darker relatives; not more than eight or ten were seen in a single day.

Of the Ducks, the handsome Cinnamon Teal was the most numerous. It nested in the alfalfa fields near water, where nests with eggs were found May 23, and also on little grass-grown hummocks in the water, where a nest with eggs

Newly Hatched Stilts

hatching was found June 19. The agility of these freshly hatched ducklings was remarkable. Almost on emerging from the egg they took to the water, swimming and diving freely. The drake was always within a few feet of the duck, when she was off the nest, and invariably sprang into the air a foot or two behind her when she took wing. We made this habit a subject of special observation without ever seeing the male bird fly first.

The Mallard was found with newly hatched young on June 17, and during this week the Pintail, Redhead, and Fulvous Tree Duck were also found nesting. The Fulvous Tree Duck, whose unique range includes tropical America,

The Los Banos Group

Background painted by C. J. Hittell; birds mounted by H. C. Denslow

Africa and India, and bespeaks for it extreme antiquity, was seen daily. These birds combine in a singular way the characteristics of both a Duck and a Goose. When on the ground, their erect pose is particularly goose-like. Their note, however, suggests that of neither Goose nor Duck, but is a long-drawn, squealing whistle.

Coots (*Fulica*) were abundant wherever there was enough water to float them, and as usual, their strongly marked emphatic notes were most conspicuous among the bird voices. In default of the dense growth in which they commonly build, their nests were often placed in such exposed situations that the sitting bird could be seen at a distance of several hundred feet. The barbed wire fences which divided certain of the flooded pastures, introduced a new element of danger into the lives of these low-flying birds, and several individuals were found hung on the barbs.

The White-faced Glossy Ibises were of special interest to us, but they were exceedingly shy and the absence of cover made it difficult for us to get near enough to hear their nasal *ooh-ick-ooh-ick* as they took wing. On several occasions, however, we were privileged to see flocks of from ten to forty of these usually dignified birds perform a surprising evolution. In close formation, they soared skyward in a broad spiral, mounting higher and higher until, in this leisurely and graceful manner, they had reached an elevation of at least 500 feet. Then, without a moment's pause and with thrilling speed, they dived earthward. Some times they went together as one bird, at others each bird steered its own course, when the air seemed full of plunging, darting, crazy Ibises. When about fifty feet from the ground, their reckless dash was checked and, on bowed wings, they turned abruptly and shot upward. Shortly after, like the rush of a gust of wind, we heard the humming sound caused by the swift passage through the air of their stiffened pinions.

On our first visit to Los Banos, we were in the field only

two days, May 23 and 24th. When we returned on June 15, to remain until the 20th, we were much disappointed to find that places where birds had been most abundant in May, were now virtually deserted.

The birds had not finished nesting, but the withdrawal of the water had deprived them of its protection. Their nesting sites were no longer islets and had possibly been raided by coyotes. The spot, although green with the vegetation due to irrigation, was slowly being reclaimed by the desert, and the birds had sought new and more favorable resorts in those portions of the marsh then being irrigated.

Evidently the abnormal and sudden rise of the water, as well as the equally unusual fall, prevents many birds from rearing young. I found numbers of flooded nests in May, which had been built when the water was still rising, while its disappearance must have been even more disastrous.

Great Blue Heron in Irrigation Ditch

These birds were unusually tame within the Los Banos town limits, and could be photographed by the roadside from a carriage in passing.

LOWER KLAMATH LAKE

I went to lower Klamath Lake (June 30-July 7, 1906) primarily to secure material for a group of White Pelicans, which the researches of Messrs. Finley and Bohlman for the National Association of Audubon Societies ("Bird-Lore", VII, 1905, p. 336) had shown to nest there abundantly.

This lake, which is twelve miles long by about half as wide, is situated in the arid, northeastern part of California, on the Oregon boundary line. Doubtless it may now be reached by the railroad which was expected to arrive the year after our visit, when the charm of its isolation will have been destroyed. But, as related in the chapter devoted to the White Pelican, the lake itself is doomed and the railroad will be a fit accompaniment to the farms which will replace the tulés.

Our way lay up the Sacramento Valley, where twenty-four-horse reapers were harvesting the rye; through the strikingly picturesque Sacramento Cañon; past Mt. Shasta, whose isolation gives it an individuality shared only with the smaller cone at its side. Shasta *reigns;* its surroundings exist merely the better to display the grandeur of its own proportions. Of all the mountains I have seen, Orizaba alone excels Shasta in its power to exact homage.

At Ager we left the railway and drove twenty miles to Beswick, arriving at midnight. There is considerable deciduous growth here along the shores of the Klamath River and Shovel Creek, and birds were abundant.

From Beswick, which consists merely of a hotel to accomodate visitors to the Klamath Hot Springs, we drove twenty-five miles to Keno. The road follows the rushing Klamath River through a region of much beauty, and when, by a gradual ascent, we had reached an elevation of about

500 feet above the river, we found the view to the south noteworthy, even in California. At this point we entered a primeval forest of thickly growing firs, yellow and sugar pines and a few cedars, and having attained an altitude of about 4300, or 2000 feet above Beswick, we began the descent toward Keno.

The forest trees decreased in size and number as we journeyed toward the more arid east, and several miles east of Keno a few scattered junipers marked the limit of this horizontal timberline.

We arrived at Keno at three o'clock and embarked on a small steamer which, following a narrow stream through the far-reaching tulé marshes, made the twenty-two miles to Klamath Falls in two hours.

This prettily situated town of several thousand inhabitants was in the throes of a boom in anticipation of the developments incident to the work of the Reclamation Service in draining and irrigating. Good lodging was secured with difficulty, and then through hospitable, rather than commercial motives.

Our search for a boat in which to visit the bird islands, distant some thirty miles, very fortunately resulted in the discovery of a recently completed 18-foot launch with a gasolene engine capable of driving it eight miles an hour.

At 2 P. M. on June 30, the day after our arrival, Hittell and I, with Ray Telford, the owner, as engineer, embarked in this launch for Lower Klamath Lake. While one would not select this type of craft from which to observe birds, it possesses conspicuous advantages over a canoe or rowboat as a means of rapid and easy transportation.

We retraced a part of our course to Keno, then leaving the main stream, turned into a narrow passage between walls of tulés, through which we slipped at high speed. Black-crowned Night Herons were stationed along the shore at short intervals waiting, as usual, for their prey to come within striking distance, but on one occasion, jumping

into the water and resting there for a second before taking wing. There were also a few Western Grebes, a Bufflehead Duck, in full adult male plumage, but which, nevertheless, had lost its flight feathers, and a family of Wild Geese, (*Branta canadensis* subsp.), with fully grown young. Later I saw an adult of this species which, like the Bufflehead, had molted its wing-quills, and could only flap over the water.

Wild Goose
The bird had molted its wing feathers and could not fly

Late in the afternoon, we suddenly emerged from the tulés into the lake. We now looked out over a broad expanse of water, but everywhere the view was bounded by tulés; in no place was the land visible at the water's edge.

Doubtless it is due to this apparent shorelessness, to the luminous atmosphere of a desert lake, to the strange cloud forms, and to the peculiar configuration of its treeless volcanic hills, that Klamath Lake owes its singular, unearthly beauty.

Possibly the mental effect of the lake's unusual surroundings was increased by the dramatic manner in which they were so unexpectedly revealed. But even on subsequent visits, when we were prepared for the lake's appearance, it still impressed us as belonging to another world.

But even more than the charms of the lake itself, of cloud effects and sunsets which no man could describe and no

artist dare paint, of birds in vast numbers, it was the views of Mt. Shasta which made our days there memorable. Although forty miles away, Shasta seen across the sea of tulés as an effective foreground, rose with surprising grandeur. Gleaming white it swept in graceful lines upward, and still upward, so far above any other visible earthly thing, so peaceful, so majestic, so supreme, that it dominated the landscape like an embodiment of godliness. Now it was rose-tinged with coming day; now startling in the clearness of morning; now hazy and cloud-wreathed in the afternoon; now soft and luminous in the afterglow of evening; but always it was inspiring.

Attracted by a flock of White Pelicans in the northeastern part of the lake, we steered toward them only to find that they were roosting, not nesting. Thence we skirted the tulés on the eastern side of the lake. and, at sunset, attempted to land for the night, but it was dark before we found a place where we could penetrate the margin of tulés, which was often a mile or more in width. Fortunately we were near the only cabin we saw on the lake, and from its owner we secured enough wood for a fire on which to boil our coffee.

With no guide to direct us, we had unconsciously gone as far from the bird islands as it was possible to do, and it was not until the afternoon of the next day that they were found. After a superficial view of the surprising number of bird colonies occupying them, we ran the launch to the home of a man named Kellear who had taken up a homestead on an island hill in the sea of tulés between the lake and Keno, about eight miles from the bird rookeries. Here we found excellent water, wood, and a comfortable straw bed in the cowyard, and here we established our headquarters.

The bird islands of Lower Klamath Lake are as unusual as the lake itself. In place of rocky reefs, sandy bars, or grass-grown mud-flats, they are composed solely of tulés which, about their borders, are matted into thick beds of

dead stalks, on which the birds nest. Some contain many acres, others less than an acre; but large or small, all furnish the essential requisite of insular isolation, and all illustrate better than any other bird islands with which I am familiar, the attraction of an island home for communal, ground-nesting birds.

"Low-lying snaky Cormorants"

The White Pelicans find here no pebbles with which to build their little mound-nests; the Caspian Terns do without sand; the Cormorants without rocks; all must nest under exactly the same conditions; even the Great Blue Herons, in default of trees, built their platform nests of tulés in the tulés.

I do not know how many islands were inhabited by birds, but I counted fifteen on which Pelicans were nesting, and there were at least a dozen more with Ring-billed and California Gulls, Caspian Terns, Farallone Cormorants, and Great Blue Herons. In most instances the birds nested near the water and were therefore easily visible.

Most of the islands were separated by only narrow channels, the canals in this Venice of bird cities, through which

passed dark, low-lying, snaky Cormorants; dainty pearl-plumaged Gulls, riding high and bouyantly, or fluttering anxiously over their venturesome young; stately, snowy Pelicans like full-rigged ships; Ducks with their little fleet of downlings, or Western Grebes carrying their chicks on their backs.

Overhead lines of Pelicans came sailing home, bearing cargo for their young, and clamorous flocks of Gulls rose suddenly, to continue in the air some dispute begun in the reeds, to which, shortly, they all returned.

These Gulls appeared to be equally divided among the California and Ring-billed species. They were the most abundant birds in the rookery and nested on nearly every island. Some nests were in close proximity to those of the Pelicans and Cormorants, but none were seen near those of the Caspian Terns. The greater number, however, were some distance from the shore, where the tulés were still upright in the tangle of the preceding years' growth. Such places were infested with young Gulls, clad in mottled gray down, which ran back into the denser growth or tucked themselves into interstices in the reeds where they were easily overlooked. It was not until I entered the blind and the returning parents called their young from their hiding-places, that I became aware of their abundance. The place was overrun with them.

As the old birds, one after the other, dropped down to the reeds about the blind, the noise and confusion was bewildering. The young birds apparently claimed parentage of any old one, but when in error, were promptly disowned with far from tender nips, treatment which, if they saw it, the real parents promptly resented. Then followed a battle of wings and voices which was quickly settled with sometimes loss of feathers but never of blood.

I have listened for hours to the calls of Gulls without divining their significance. These birds, in common with other members of their genus, threw their heads upward like

baying dogs while uttering a loud, emphatic *ki-ki-ki-ki,* and when hovering over the rookery chattered *ka-ka-ka-ka* more rapidly than human tongue could enunciate the syllables. At times, when swimming, they jerked out the single syllable *go,* with such force that the head was thrown forward and the bill entered the water; but I could attach no meaning to any of these calls. The note of the young birds was a shrill, squealing whistle.

"The old birds, one after the other, dropped down into the reeds"

The Caspian Terns, of which there were but about 300, all in one colony, occupied a point of an island where they were associated only with Cormorants. The Gulls built nests of the tulé stalks, but the Terns laid their eggs in depressions in the fallen, matted reeds or silt which, near the water, sometimes covered them. Most of the eggs had hatched and, as I landed, the downy young scurried into the reed forest which bordered the open space along the shore.

Although the blind was erected with no attempt at concealment, the adults, all screaming, came back in a body almost as soon as I had disappeared within it, and I shortly experienced the satisfaction of being surrounded by this, the largest and, in North America at least, one of the rarest members of its genus. All wore the shining black cap with elongated crest feathers, and had the bright coral red bill of the nuptial season.

Caspian Terns

As, with gracefully uplifted wings, the daintily plumaged birds alighted, the young, doubtless in response to their calls, ran out from the reeds and then ensued the usual squabbling until the chicks, finding their own parents, were snugly nestled under the silky white breasts. On these occasions they sometimes fought three-cornered duels, but as the sex of the contestants was unknown, I could not surmise the meaning of the struggle.

Like the young of the Common Tern and doubtless also of the other members of this subfamily, the young Caspian

Terns swam easily, taking to the water when cut off from the reeds, but the adults were not seen to alight on the water.

Having heretofore failed to establish intimate relations with that fine bird, the Western Grebe, I had anticipated an opportunity to observe it here, where, according to the report of Finley and Bohlman, it had nested abundantly the

"Surrounded by .... the rarest members of its genus"

preceding year. We found, however, only one occupied nest, and saw comparatively few birds; but we did find numerous Grebes' bodies, from which the breast had been stripped.

The cause of their death was revealed one morning when we found a ruddy-cheeked, white-bearded old hunter in the rookery. Resting quietly in his skiff, gun in hand, he promptly potted every Grebe which was unfortunate enough to rise within range. He had only five birds in his

boat; but his work was nearly finished; the rookery had been " shot out."

Living in a house-boat hidden somewhere in tulés, this degenerate representative of the pioneer trapper seemed far from the world of millinery adornment, but no stock-broker kept his eye on the " tape " more keenly than he did on the quotation of the New York feather market, with which the dealers regularly supplied him, and the moment the figures promised a profit, he took to the field.

Young Great Blue Herons

It appeared that for several preceding seasons Grebes' breasts had brought only fifteen cents each, and at this price the birds were not worth killing. Hence their abundance during the visit of Finley and Bohlman. In the meantime, the demands of fashion had advanced the price to fifty cents per breast, a sum sufficient to tempt the hunter, and in a few weeks he had wiped out the increase of years.

He was a pleasant-eyed old fellow, and there was some

thing about him to which the hunter in me responded. Big game and fur-bearing animals quickly disappear before the advance of civilization, but human nature does not change so readily.

The fact that there were no buffalos to kill or beavers to trap, did not prevent this man from being a hunter and in default of larger quarry he shot Ducks and Grebes and trapped minks, making enough to live in the isolation which his nature called for.

The fact that my "specimens" were designed for a museum, and his "skins" for a milliner's shop did not seem to him to create any special difference in our calling and, believing that we were both plying the same trade, he freely discussed its various aspects and offered me much advice as to the best manner in which to kill Grebes.

Pelicans, he believed, should be protected by law because they ate the dead fish which at that time dotted the lake in hundreds. But on Cormorants—"Shags" he called them —there ought to be a bounty because they ate only live fish. As for Grebes, they were no good one way or the other, except to kill, and if I had advanced æsthetic reasons for the preservation of these marvellously graceful witches of the water, I should probably have spoken in a foreign tongue. Perhaps it will be time enough to turn our attention to the æsthetic education of the hunter when we have convinced the wearer of the borrowed plumes of her moral responsibilities in this matter of bird destruction.

So much easier is it to collect material things than facts, that before I had even made the acquaintance of Klamath Lake birds I had secured the specimens, accessories and photographs on which to base our proposed group. Mr. Hittell had completed his sketches, and with a study of its bird-life only just begun, I left this region of enchantment.

THE SIERRAS

My experience in the Sierras is limited to a few days (June 24-July 5, 1903; June 8-10, 1906), passed at Price's camp in Glen Alpine and on Fallen Leaf Lake near Lake Tahoe, and a short trip from this point over the Tahoe-Placerville stage route to Silver Creek. Brief as was the time, it was more than sufficient to impress me with the manifold attractions of this region for the nature-lover. At this season rain is infrequent and the camper, with tent or without, may hunt the world over for a more ideal climate or more delightful surroundings.

The country about Tahoe offers a most inviting field to the ornithologist. It is accessible and diversified; primeval forests, marshes, and snow-capped peaks being in close proximity; and as long as William Price and Walter Fisher maintain their camp on Fallen Leaf Lake, the visiting naturalist will be assured a congenial home and efficient co-operation.

With two other members of the American Ornithologists' Union's transcontinental party of 1903, I left San Francisco the morning of June 23, and reached Tahoe Inn in the evening. Awakened by the emphatic *come-right-here* of the Olive-sided Flycatcher, I arose for an early view of Tahoe, its encircling mountains and forests, and found as well, a male Hermit Warbler, and a nest of a Mountain Chickadee which evidently contained young. On comparing notes at breakfast, I learned that both of my companions had independently found the same nest, though it is doubtful if another guest of the hotel knew of its existence. I was reminded of Thoreau's arrowhead.

I know of no lake in this country comparable with Tahoe. In size, in the intense blue of its surprisingly clear waters,

in its setting of great conifers and snow-ridged mountains it stands, in my experience, preëminent.

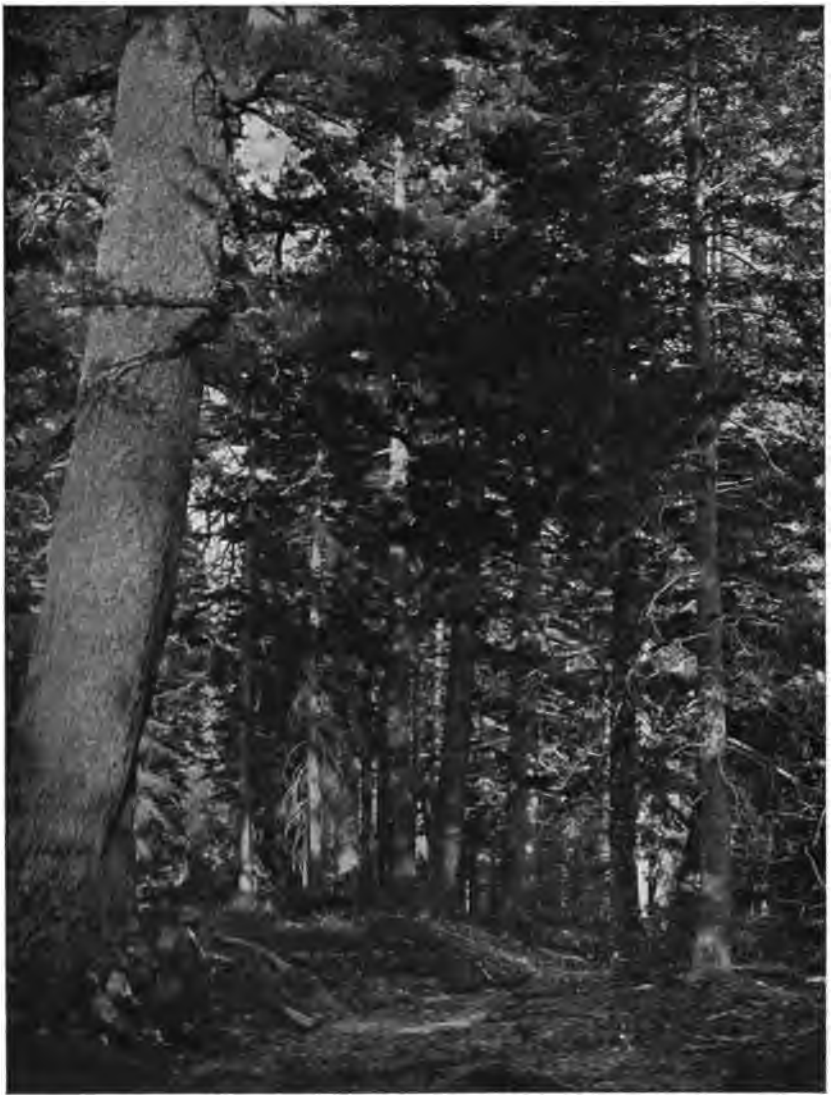
The morning we sailed for Tallac was absolutely calm and, as the steamer glided over the mirror-like surface of the lake, the bottom could be seen at astonishing depths. But when, some days later, we returned, a sixty-mile-an-hour gale created a sea which played havoc with most of the passengers and forced the one hundred and twenty-five foot steamer to abandon part of her route.

At Tallac, White-crowned Sparrows sang plaintively in the pines near the hotel, and Juncos trilled and twittered in the shrubbery. Later, I saw near Tallac a single American Magpie, (*Pica pica hudsonia*), ornithological evidence that I was on the eastern slope of the Sierras. Here one takes a stage for the five-mile ride through the woods around the border of Fallen Leaf Lake, to Price's Camp, at an altitude of about 6,300 feet.

From this point, there are a score or more of mountain lakes to be reached within a few hours. Mt. Tallac, snow-capped, towers overhead, and Glen Alpine, with its fine trees, dashing stream and water-falls, lies at the back of the camp.

The vicinity of the camp itself is as favorable a place for bird study as one could hope for. Thick-billed Fox Sparrows, (*Passerella iliaca megarhyncha*), were here the most conspicuous singing birds, and one could not ask for a more musical, cheerful songster. The loud, single whistle of the Mountain Quail was a distinctly new note, strikingly unlike the *sit-right-down* of the Valley Quail. The birds called from the dense conifers and were exceedingly difficult to see. When alarmed, they carried their long crest feathers erect, a singular ornament, but one which was quite in keeping with their graceful alertness.

Green-tailed Towhees, with their mewing call and bright song; Western Tanagers (*Piranga ludoviciana*), uttering their clean cut *clit-tuck* and unmistakably tanagrine chant;



The Forest in Glen Alpine

Ruby-crowned Kinglets, the most gifted of small feathered vocalists; trilling Juncos, Calaveras, Audubon's, Pileolated, and Macgillivray's Warblers were the birds whose voices were most prominent.

Several times I saw Solitaires perched silent and pensive, and about the falls in the Glen, active Water Ousels were sometimes seen, but their song season was over.

A nest of the Blue Grouse, (*Dendragapus obscurus sierræ*), with broken egg-shells, from which the chicks had only recently emerged, was found, June 30, well up the Glen and, on one occasion, a bird of this species was heard to utter its hollow, ventriloquial *boom*.

Blue-fronted Jays were among the common forest birds and occasionally Clarke's Crows crossed the Glen from tree-top to tree-top to disappear up the mountain side.

The Woodpeckers of this region are of great interest and will afford the eastern ornithologist some brand new sensations in bird-life. In addition to the Red-shafted Flicker and the western form of the Hairy Woodpecker, I observed the blackbird-like Lewis's Woodpecker in the woods about Tallac. More generally distributed were the quaintly plumaged White-headed Woodpecker, and the Red-breasted Sapsucker, while, on the surrounding mountains, the beautiful Williamson's Sapsucker was not uncommon, a nest containing young being found in a dead tree on July 2.

All the species mentioned were seen between June 24 and July 5, 1903. When I visited the camp from June 8 to 10, 1906, the Glen had not yet shaken off the grip of winter. Snow-slides, ten feet deep, blocked the trail and along their edges, snow-flowers, like little torches, blossomed. The willows and alders were blooming, White-crowned and Fox Sparrows, Olive-sided Flycatchers, Mountain Quail and Chickadees, were singing, but the Warblers had not yet come up from the lower altitudes.

On June 30, I crossed the mountains on horseback at Angora Lake and struck the Tahoe-Placerville stage-route

to the south, following it over the divide and down the western slope as far as Georgetown Junction, which may have deserved this designation when this route was the main highway into middle California, but which exists now only as a name. Here, I left the road for a trail, used by dairymen in bringing their herds from the parched valleys to the flow-

Camp on Silver Creek

er-filled alpine meadows, and climbed the steep grade through the forests to Silver Creek, where a junction was made with Price, Louis Fuertes and other members of our Glen Alpine camp, who had struck directly across the mountains, ascending Pyramid Peak by the way.

Here is a trip through a region filled with associations of California's early history, in which primitive means of transportation still exist, but through which, nevertheless, a journey may be made in perfect comfort, with opportunity to stop at inns situated amid the wildest and most picturesque surroundings. Reaching Tallac the journey may be

continued by steamer across Lake Tahoe, and the railway reached at Truckee. I commend it with enthusiasm to the nature-loving tourist.

We camped beneath the spruces, at an elevation of 7000 feet, and from this base ascended to still higher woods, where great snow banks lay in the shade of the trees.

The season was less advanced here than in Glen Alpine. Hermit Thrushes, (*Hylocichla guttata sequoiensis*), were singing divinely, and on several occasions I heard the ecstatic, highly musical outburst of the Solitaire. It is wholly unlike the songs of the Mexican Solitaires, (*Myiadestes unicolor and M. obscurus*), but strongly suggests the rapid flight song of the Rose-breasted Grosbeak.

We were now fairly in the the Boreal Zone. Lincoln's Sparrows sang from the alders bordering the snow-fed brooks, Canadian Nuthatches trumpeted nasally from the pines, while Pine Grosbeaks, (*Pinicola enucleator californica*) and Evening Grosbeaks, (*Coccothraustes vespertinus montanus*) furnished even more impressive evidence of the boreal character of our faunal position. Still, less than fifty miles away, on the warm, western Sierran foot-hills, I had seen orange groves.

The nights were cool at Silver Creek, and rolled in our blankets, we sought close companionship with the camp fire.

Doubtless it was to the sense of friendliness and good cheer, born of a certain atmospheric hospitality which characterizes Sierra summers; to the tonic of mountain air; to the melody of the Hermit Thrush and joyous carol of the Solitaire; to the singing of a thousand streams on their way to the sea; to a hundred subtle, potent causes, that I may attribute the physical exhilaration and spiritual exaltation which I experienced in the Sierras.

Enter California through the deserts that form its southern boundaries, but leave it, if leave it you must, through the passes of these majestic mountains. You may go out from their shadow but never from under their influence.

PART VII.

BIRD-LIFE IN WESTERN CANADA

THE PRAIRIES

THE PLAINS

THE MOUNTAINS

THE WHITE PELICAN

White Pelicans on Big Stick Lake, Saskatchewan (see p. 384)

BIRD-LIFE IN WESTERN CANADA

INTRODUCTORY

The wild-fowl which, twenty years ago, were so abundant in our northwestern boundary states, to-day characterize the sloughs and lakes of the adjoining Canadian Provinces. In a short time, most of them will have retreated to the still more remote north, eventually to be forced beyond the parallel profitably habitable by the ranchmen. Crowded at the best, within comparatively small areas, by reason of their aquatic habits, the nature of their haunts makes them particularly susceptible to those changes in environment which man, the settler, directly or indirectly occasions.

Shooting, the grazing of herds of sheep and cattle, which destroy cover or tread on nests, and especially the draining and tilling of land, are the chief factors in reducing the numbers of these ground-nesting birds, which, in brief, are quickly routed by civilization. Where, therefore, the map is dotted with towns and lined with railways, they can continue to breed only on islets and, even then, require special protection.

It was my valued privilege to have at least a glimpse of this wild-fowl life, in June, 1901, at Shoal Lake, Manitoba, and in June, 1907, near Maple Creek, Saskatchewan. On both occasions my time was largely occupied by the requirements of special collecting, but nevertheless, observations were made which seem worth recording. They are, therefore, presented as a contribution to the ornithology of a region whose bird-life is so rapidly yielding to the pressure of new conditions, that apparently it will soon be as devoid of nesting wild-fowl as are our northern border states, unless the Canadian Government, profiting by our experience, takes immediate steps to protect its birds during the breeding season.

That laws prohibiting the killing of wild-fowl at this season, and the destruction of their nests and eggs, have been passed and are enforced is not enough. The draining of sloughs and raising of cattle cannot be treated as violations of the game-laws and still both may be more destructive than many men with guns. A more effective form of protection is needed and this can best be secured by the creation of reservations or bird refuges. If it seems impracticable because of their value to the stock raiser, to set aside sloughs and lake borders for this purpose, no good reason appears to exist for refusing to give the birds title, for all time, to the islets and "reefs" which are found in many of the lakes of this region. These islets are rarely if ever of value to the ranchman, and they already are of infinite value to the birds. Protected by water from their natural enemies, many birds are wholly restricted to them in the nesting season, and with a wise treatment of this question by the Canadian Government, they would become the wild-fowl nurseries of western Canada.

Double-crested Cormorants

THE PRAIRIES

The west-bound naturalist, who, from a Canadian Pacific car-window, has been oppressed by the dearth of life in the country north of the Great Lakes, welcomes the change from this desolate region to the poplar-dotted prairies of Manitoba with their teeming bird-life. Once west of Winnipeg, and even in the ditches made by grading the track-bed—if they be not too near a settlement—Grebes, Coots, and Ducks of various species may be seen leading broods of young; and when the road passes a reed-bordered lake, or slough, the place seems alive with these birds, Bitterns, Yellow-headed and Red-winged Blackbirds, Black Terns and Franklin's Gulls. I recall no railway journey on which more birds may be seen from the train; and consequently none which arouses in the arriving ornithologist a higher degree of enthusiastic expectation.

On June 13, 1901, just after passing through a bird community of this kind, Mrs. Chapman and I left the Canadian Pacific train at Marquette, a station on the prairies, thirty miles west of Winnipeg, bound for Shoal Lake, eighteen miles to the north. Conveyance was eventually secured from a neighboring ranch and the drive was notable chiefly for the numbers of Black Terns which, swallow-like, circled about the wagon, feeding on the insects we flushed from the grass.

We pitched our tent as near the southern end of the lake as the marshy nature of the ground would permit, and not far from the cabin of an Englishman whose attractive half-breed wife prepared our meals. He acted occasionally as our guide; devoting himself between trips to Burton's "Anatomy of Melancholy" and a cabinet organ which he played with exceptional taste.

To avoid custom-house and transportation difficulties,

we had waited until arriving at Winnipeg, where satisfactory outfits may be hired, before securing our camp equipment. A ten by twelve wall tent was our main shelter, while a seven by seven wedge tent was used as a work-room and for short trips. The frequent, heavy thunder showers kept the thick prairie turf saturated with water and induced us

Camp at Shoal Lake

to floor roughly the larger tent with such boards as our guide could spare from his cabin. Throughout June a camp stove was by no means a luxury, and each evening, a cover having been placed on the chimney-top, a fire, smudged with green poplar leaves, was made, to clear the tent of mosquitoes. These insects were so numerous as to interfere with field-work on the prairie and lake border during the day, while the hum of their united voices about our tent at night, resembled the sound of steam escaping from an engine. Fortunately they were not found on the lake, nor even in the quill-reeds.

Probably no one but an ornithologist would have selected our camp-site, but even had the country been birdless it would have had attractions of its own. There was the inspiring breadth of the prairie view; there were the endless

reed forests with just a strip of blue water appearing over their tops; there were the prairie flowers—roses, lilies, harebells, anemones and many others—some of which we transplanted in their thick bit of turf to form a garden at our tent door; and in preparation for the almost daily thunder storms, there were cloud effects such as I have never seen exceeded elsewhere.

Shoal Lake, first made known to ornithologists by Donald Gunn in 1868, is some thirty miles long with an average width of ten miles in its southern third, and of about three miles in its northern two-thirds. Its shores, for the greater part, are widely margined with densely growing quill reeds, which attain a height of from six to eight feet above the water. Where the fringe of reeds is a mile or more in width, the shore of the lake can be reached only by following the narrow water ways that wind through them.

The northern end of Shoal Lake is thickly wooded with poplar, but I saw little of this region, my work being in the main confined to the vicinity of our camp where the abundance of bird-life left time only for trips to the islands in the lake. Here the country is more open, wide stretches of fertile prairie with its rich growth of grasses, being dotted with groves of small poplars.

In the slightly lower ground, bordering the line of reeds which marked the edge of the lake, the grasses were denser and there were occasional small sloughs. So flat is the country that from the higher ground near our camp, the water of the lake was barely visible over the tops of the reeds.

Well out in the lake are a number of small islands. In some instances, they are formed of only a few great rocks with a beach of pebbles when they are known locally as "reefs." Such islands were inhabited by Double-crested Cormorants, California Gulls, Common Terns, and one held a small group of White Pelicans, as described in the chapter devoted to that species.

Other and larger islands were grown with grasses, reeds,

and rose bushes, which invariably held the nests of Ducks; Spoonbills, Baldpates, Mallards, Pintails, and Blue-winged Teal being the common species, while one nest of White-winged Scoter was found. Birds were exceedingly abundant in the reed forests of the lake, the more characteristic species being Coots (*Fulica*), Western Grebes and Franklin's Gulls, nesting in colonies, Black Terns, Black-crowned Night Herons, American Bitterns, Yellow-headed and Red-winged Blackbirds, and Long-billed Marsh Wrens.

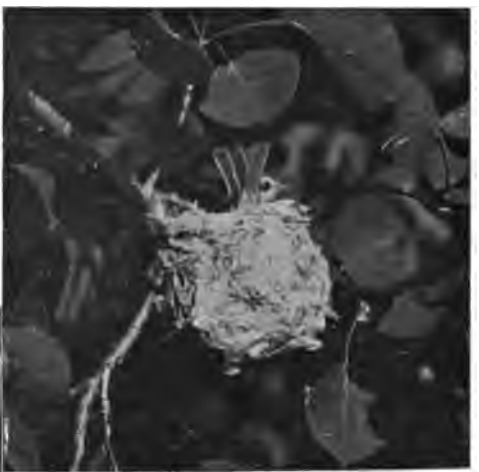
About the marshy border of the lake, Soras, Wilson's Phalaropes, Blue-winged Teal, Nelson's Sparrows and Short-billed Marsh Wrens were the commoner birds; while the characteristic prairie species were Bartram's Sandpipers, Killdeer, Nighthawks, Western Meadowlarks, Prairie Horned Larks, Bobolinks, Cowbirds, Vesper, Savanna and Clay-colored Sparrows.

The lake and its shores claimed the greater part of my time and but little attention was devoted to the poplars, where the birds observed most commonly were Crows, Kingbirds, Baltimore Orioles, Bronzed Grackles, Warbling Vireos, Yellow Warblers, Catbirds, Veerys and Robins.

The location of our camp by the side of a grove of poplars and near the junction of prairie and marshy lake border, brought us within sight or sound of nearly all the birds just mentioned. The days are long in this latitude and at half-past three each morning, we were awakened by a group of Yellow-headed Blackbirds which selected our poplar grove for the delivery of their matutinal chorus. If result were commensurate with effort, the Yellow-head would be a world-famed songster; but something besides unbounded ambition and limitless muscular exertion is required to produce music. In vain the Yellow-head expands his lungs and throws out his chest, his wide-spread tail testifying to the earnestness of his endeavor; sound he produces in volume, but surely such a series of strained, harsh calls, whistles, like escaping steam, grunts, groans and pig-like squeals

never before did duty as a song! In his youth he does far better, the note of the young bird being a wooden-rolling call as different from the voice of the parent as is that of a young Baltimore Oriole. Before the effect of novelty was lost, the yellow-headed serenaders returned to the reeds and the dominant bird song about our camp for the rest of the day was that of the Western Meadowlark.

In the poplars, the Warbling Vireo was the song leader, the little double-toned roll going off at intervals, the time of which was regulated by the reply of a rival singer in a neighboring grove. From crowing Cocks to Vireos, nothing so stimulates song as song. Even when on the nest, while his mate was feeding, a Vireo near our tent could not refuse the song challenge; a habit which guided me to his home.



Female Warbling Vireo Incubating

Male Warbling Vireo Singing on Nest

Unlike the Yellow-headed Blackbird, the Bronzed Grackle appears to appreciate his limitations as a vocalist and makes small effort in that direction. Nevertheless these

birds were sufficiently common to make their notes a not inconspicuous part of the chorus of bird voices. I spent much time in futile search of a Grackle's nest which the actions of the birds indicated was in the grove at our camp; eventually it was discovered on the *ground,* among the poplar sprouts, within sixty feet of the tent. With the aid of an umbrella blind, it was possible to observe, at close range, these birds feeding their family of four. The returning parent was invariably greeted by four mouths spread wide in mute appeal for food, and apparently the nearest bird was fed first. But by that nice adjustment of the nervous system which, as Professor Herrick has shown, prevents a young bird from receiving an undue share of food, there was no "swallowing response" from the mouth of the well-fed youngster and the parent acting on this hint, removed the food, and tried another applicant.

The sharp *peek* of passing Black Terns was a frequent note. The feeding habits of these birds and of Franklin's Gulls is a strange sight to the eastern bird student, whom experience has taught to associate members of this family with bays and sandy beaches.

From our tent door in the early morning I sometimes found the surrounding prairie thickly dotted with Franklin's Gulls actively hunting grasshoppers, the birds at the rear constantly arising to take the lead, only to lose it to those that followed. It is a novel sight also, to see these beautiful birds following the plough to secure the grubs exposed in the lengthening furrow, with their white and pearl plumage gleaming against the fresh black prairie soil. The Black Terns, which often take part in the hunt, appear to feed exclusively on insects, and it is only when the high winds set the prairie grasses rolling in long billows and the Terns gliding low, gather insects from the grassy crests, that one is reminded of their relationship to birds of the sea.

From the sloughs came the whinny of Soras and booming of Bitterns, and from the great quill reed jungles such a

babel of bird notes that one could imagine all the birds of the lake were in convention there. The Coots were responsible for much of this noise, but the yellow-heads were not far behind them, while the loud grating whistle of the Western Grebe, the sonorous *kow-kowing* of the Pied-billed Grebe, and other weird, unidentified calls, produced an indescribable and altogether delightful *ensemble.*

Although there was no marked, sultry, noonday period and birds could be seen in numbers from daylight to dark, comparative quiet reigned in the reeds during the day; but toward sunset the convention reassembled, to resume the morning's discussion in a session which lasted until ten o'clock. The birds' day was therefore between eighteen and nineteen hours in length. Grackles were seen feeding their young as late as half-past nine, and one asks whether the greater amount of food consumed per day does not increase the rapidity of the young bird's growth and shorten its stay in the nest.

A walk of fifty yards from our tent toward the lake, which was distant about three hundred yards, brought one into the taller grasses of the slightly lower ground. This was the home of Wilson's Phalarope, a new bird to me and one which, because of its peculiar marital customs, I observed with no little interest. On my appearance, one or two of these birds invariably flew about me with a slow, jerky, halting flight and sinuous movement of the neck, as it uttered a soft *quok.* Usually the female took the lead, the male following. This pair of birds, I believe, had young hiding in the dense grasses, but on June 15, I found a nest with four eggs, which on the 19th were within a few days of hatching. The male, as usual, incubated, unaided, but it was evident that the female had a keen interest in the welfare of her home, in spite of her unmaternal habits, and on every occasion when the male was flushed from the eggs and fluttered off over the grass, he was joined by his mate who showed her interest by flying anxiously about me. These females,

therefore, are by no means such gay and irresponsible grass widows as they have been said to be. While they take no part in the duties of incubation they nevertheless are clearly concerned with its results, appearing in defense of their household when circumstances require their presence. They are exquisite creatures and when swimming high in

Blue-winged Teal's Nest
The eggs were covered by the bird when leaving the nest

the water with dainty nodding motion of the head, present as pleasing a picture of bird-life as beauty of plume and grace of motion can combine to produce.

The high grasses in which the Phalaropes nested, evidently held also the home of that singularly distributed bird, Nelson's Sparrow, whose little guttural trill was a common note, but in spite of much anxious chirping on their part and much searching on mine, the birds succeeded in keeping their secret.

Blue-winged Teal also nested here, and one of the distinctive experiences of bird study in this region, is the flushing of wild Ducks which, with a truly surprising flutter, tumble from their nest at your feet, invariably speeding your circulation with a bound. Under these conditions, there is no time for that careful and complete covering of

Blue-winged Teal's Nest
The downy covering raised to show the eggs

the eggs with a downy blanket, which precedes the more deliberate departure from the nest, for feeding.

Admirably as the incubating Duck, feigning to be wounded, attempts to draw you from her nest, the performance is not even a poor imitation of her actions when she wishes to cover the retreat of her brood. A Mallard one day gave an excellent exhibition of this habit. At her first call of alarm the young birds scattered widely, no two, apparently,

going the same way, and when she had finished directing their movements, she came herself boldly from the reeds to hold my attention by the most elaborate demonstrations of helplessness.

A pair of Black Terns which were nesting in a small reed-grown slough near our camp, showed an even more

Black Tern Incubating

remarkable control over their downy young, but adopted a less strategic method of protecting them.

The nest was discovered, on June 16, on a small knob of mud and water-soaked vegetation which had been selected as a foundation for the nest of coarse reeds. At this time it contained one egg. On June 18 a second egg was laid and, without waiting for the usual complement of three, incubation was begun. At no time during this remarkable period of a bird's year did the Terns fail to resent intrusion on

their haunts. The Blue-winged Teal and Wilson's Phalarope nesting in the long grasses on the border of the slough, fluttered from their eggs only when one seemed about to step upon them, but the Terns sprang into the air and, with sharp screams, came to meet me when I was thirty yards away.

On June 25, there occurred an unusually heavy fall of rain, raising the water in the slough several inches and threatening to inundate the little island. But the Terns saved their eggs from the flood by bringing fresh nesting material and raising the height of their home; though, whether the action was performed with a definite object or was merely such a display of nest-building instinct as is not infrequently seen during incubation, it is difficult to determine.

On July 5, after an incubation period, therefore, of seventeen days, the first egg was hatched. Three days later, with Ernest Seton, who had joined us on the 3d, I visited the nest, expecting to see a pair of downy young but, to our surprise and disappointment, it was deserted. Evidently, however, there was something not far away in which the Terns were greatly concerned. With piercing screams they darted at us, once actually hitting Seton's hat.

Search failing to reveal any sign of the young birds, the camera was left to play detective. Focusing it on the empty nest and surrounding it with cat-tails, we attached some seventy feet of tubing and retired to the high grasses of a neighboring dry bank. But we were not hidden from the Tern. She hovered over us, shrieking her disgust with scarcely a pause, turning her long beak to this side and that, as she brought each eye in turn to bear. Finally her *craiks* grew softer, and, fluttering over the nest, she uttered a soft *wheent-wheent-wheent,* which probably meant to her chicks "It's all right; come back home now." After half a minute of this calling, she fluttered lower and dropped out of sight behind the reed barriers.

Acting on the belief that she had called the chicks back to the nest, a dozen rapid strokes were given to the bicycle pump at the end of the tube, and the Tern promptly flew up into the air, uttering her loud *craik-craik* in a way which plainly showed us that the shutter on the camera had been sprung. Instantly we rushed through the mud and water to the nest, but only to find it as empty as before.

"She hovered near us"

Inserting a fresh plate in the camera, we returned to our hiding place. Again the Tern scolded us vigorously, but after a while, as before, her fears seemed to decrease; she gradually drew nearer to the nest and eventually dropped lightly down into the reeds. After waiting a moment for her to settle herself, the bicycle pump was again used, and at the twelfth plunge of the piston the Tern shot upward as though she were blown from the end of the tube! We accepted her action as an unfailing indication that the shutter was

properly released and once more splashed quickly through the water to see what we might see; but only an empty nest met our gaze, and we were as ignorant of the fate of the young Terns as we had been in the beginning.

The continued anxiety of the parents, however, encouraged us to continue our efforts to solve the mysterious dis-

Black Tern Attacking

appearance of their chicks, and, after several more attempts we reached the nest just in time to see the two little ones paddling away into the surrounding reeds, like ducklings. This caused us to believe that on each occasion they had returned to the nest only to desert it again as the old bird left them, but it was not until the plates were developed, a month later, that we could really put together the whole

story. Its main facts are shown in the photographs which are here reproduced. One pictures the Tern while incubating. A second pictures her brooding her young after one of their enforced baths in the surrounding waters. A comparison of these pictures shows the difference between the poses of the bird during incubation and while brooding. A third photograph reveals the two little Terns just as they had climbed into the nest after their long swim for safety.

Black Tern Brooding

The incident is an extremely interesting illustration of the power of that parental control on which the safety of the young bird so largely depends. Here were non-natatorial birds which, at the age of three days, in response to the commands of their parent, made, without hesitation, what was, doubtless, their first plunge into the water, swimming so effectively that we were unable to discover their hiding-place,

although we reached the nest within ten seconds after they had left it. Nor did they apparently return to their home until they were directed to do so. The commands of the parent must have been given from the air, since pictures showing the old bird brooding its chicks were made as soon as the parent returned to the nest. The old bird invariably sprang into the air at the click of the shutter and the empty nest

"Two little Terns"

proved that the young birds deserted it at the same moment, and this performance they repeated as long as their strength lasted.

An aged punt, which I trust was launched with an apology to the lake, was used to explore the reed forests. This was exciting but exasperating work. Strange calls from just beyond the limit of vision in the dense growth, lured one to continued exertions with the push pole, but the *swash* of the clumsy craft gave warning of our coming and the unknown voices always remained a mystery. A pair of Holbœll's Grebes had a nest on a small raft of water-soaked reeds near the boat landing, but my best efforts to see the

bird on its nest failed; nevertheless, whether I approached cautiously or as rapidly as possible, five warm eggs were always carefully covered, while the bird, with body nearly submerged, uttered a sharp *cluck* as it swam nervously about in the near-by reeds. Fresh leaves which I placed on the nest-covering in the morning were missing in the afternoon showing that the bird had returned to the nest in the meantime. The eggs hatched June 17.

The Western Grebe, whether flushed from the nest or leaving it to feed, does not, as a rule, cover its eggs, and only in exceptional cases were the eggs concealed by the nest material. Nevertheless I have seen the birds, while standing nearly erect in the nest, attempt to place some covering over the eggs before sliding into the water as I approached. I have found a colony containing dozens of nests of these birds, each with eggs, not one of which was covered, although the birds had left them voluntarily. Other observations show that they spend much time away from their nests during the day.

They are splendid, spirited birds and hold their long, slender necks with a dignity and grace of carriage which should win them the name of Swan-Grebe. Although without the feather "ruffs" of some Grebes, their shining black crowns and sharply defined, absolutely immaculate, snowy-white cheeks and necks are striking characters and, when seen at short range, their bright red eyes increase the distinction of their appearance. While preening their plumage, they often lie on one side in the water, when the light flashes from their glistening breasts as it would from a mirror.

When mating, the feathers of crown and nape are fluffed, the birds face each other and, with evidently intense excitement, wave their heads and necks from side to side with a swaying, sinuous motion; then, as they come together, there follows a rush through the water which can be heard above all other sounds of the reeds.

Yellow-headed Blackbird Feeding Young

The Swan Grebe's voice is a loud, double-toned, whistled *c-r-r-ee-cr-r-r-ee,* which can be heard distinctly when the bird is beyond reach of the eye, on the open waters of the lake, and even a poor imitation of this far-reaching call brings the lakes of prairie or plain more clearly before me than the memory of the note of any other of their bird inhabitants.

The average number of eggs is four. The young Grebe can swim the moment it leaves the egg but at this early age it will crawl into one's hand rather than remain in the water. Two or three hours later, however, when the plumage has dried, it voluntarily leaves the nest to accompany the parents, whose backs now form its resting place. Should the parent dive while the young bird is sitting on its back, the little fellow is apt to lose his place, then he strikes out for himself; swimming and diving readily. But when the

downy chicks are held beneath the wing, whence the heads protrude through the tertiaries, they are taken under the water.

The feather-eating habit of Grebes is well known but I believe it has never been explained. Possibly the adults may swallow the feathers secured through their frequent

Coot's Nest with Newly Hatched Young

preening, but I am at loss to understand why chicks not more than three days old should have their stomachs tightly stuffed with a ball of their parents' feathers. In the stomach of one I found a compact wad of 238 feathers, and in another there were no less than 331. All were the smaller body feathers of the adult Grebe.

While the Grebes and Coots were the ruling spirits of the water, the Yellow-headed Blackbird was as clearly the

dominant bird of the reeds. This bird is possessed of a personality which would doubtless repay close study; but it is one of the penalties of hurried collecting trips that but little time can be devoted to one bird, if one would gain even a superficial idea of the avifauna as a whole. It is your stay-at-home, not your traveling naturalist who has opportunity for prolonged, continuous and adequate observation.

Long-billed Marsh Wren Entering Nest

In spite of their abundance and vociferousness, the Yellow-heads conducted their household affairs with more or less secrecy. Their nests were tied to the reed stems at an average height of four feet from the water. Soaking wet grasses are used in building and, in drying, the well-woven structure becomes firm and dense. I did not see the male feed the young birds while they were at the nest, though he seemed attentive enough after they had made their initial flight. A female which I watched for some hours in active at-

tendance upon a brood of four young, approached the nest quietly and with the utmost caution, but, having delivered her supply of food, she always uttered a series of the most surprising squawks as she left the nest for more.

To one accustomed to find Night Herons nesting in trees, often at a height of eighty feet, it was surprising to

Young Black-crowned Night Herons and Nest

observe these birds nesting on a platform of reed stalks only two or three inches above the water. The structure looked more like the home of a Coot than of a Night Heron and aptly illustrated the influence of environment both in determining the character of the nesting-site and that of the nest itself.

Several attempts were made to study the bird-life of the " reefs " in the lake, but these islands were so small and so

thickly populated with birds, that the erection of the most inconspicuous kind of a blind aroused their suspicion and I learned little more of them than is conveyed by the photographs of their nests with eggs and young.

A " reef " north of the Narrows was so thickly covered with the nests of Double-crested Cormorants, that apparently not a site was left unoccupied. The black, half-naked

Young Double-crested Cormorants and Nests

young, with rapidly palpitating pouches, sat panting in their nests, crying like puppies. Both they and their home were as unattractive as birds and their haunts can well be. A perch, brought by an adult as food, was said by my boatman not to have been found in Shoal Lake, where pickerel abound. It had possibly been captured in Lake Manitoba.

My failure to establish intimate relations with the small colony of White Pelicans nesting in the lake, is related be-

yond; nor did I have more success with the California Gulls.

The Common Terns occupied the larger islets with sandy beaches, where their nests were placed closer together than I have seen them elsewhere; ten being found in a measured six-foot square. Always nervous, possibly the proximity of the four or five hundred birds, in a colony which was under observation for some hours, accounted for the frequency with which they left their nests. Without evident cause of alarm, and acting as a single bird, with a rush of wings, they would suddenly dart from their nests out over the water. Not a note was uttered but as they circled and fluttered above their eggs, they called the familiar *tear-r-r,* and gradually dropping, soon returned to their eggs. But scarce were they settled when the performance was repeated, and if a hatching egg had not been found, the adequacy of their incubation methods might have been questioned. There appeared to be exceptionally wide variation in the coloration of the eggs in this colony; one nest containing two which were blue, and unspotted.

A railroad now passes within a stone's throw of our camp-site at Shoal Lake and the bird-life of the borders of the lake has doubtless already yielded to the changed conditions implied by increased accessibility; but the reefs and islets are not so readily affected and let us hope will long hold their own.

THE PLAINS

As we journey westward through Manitoba, following the Canadian Pacific railway into Saskatchewan and eastern Alberta, the rainfall gradually decreases, and when we have reached the isohyetal line of ten to fifteen inches, which swings northwestward at about the one hundred and second meridian, we may be said to be fairly on the Plains. Except along the streams or among the sand-hills, there is no native forest growth, and the eye may vainly search the horizon for the sight of a single tree.

The rolling ground is covered with a thick growth of grass which in lower, moister situations, is replaced by higher species, a small sage bush, rose-bushes and a recumbent cactus grow sparsely, and, in season, there is a profusion of flowers. To this sketch a botanist would add many details but here, at any rate, we have those features of the vegetation which impress themselves on the layman.

I had always attributed the plainsman's glorification of his native heath to lack of experience, love of home, or the influence of those associations which so fortunately predispose us toward the land of our birth. That a flat, treeless, featureless country could, from a scenic standpoint, be seriously compared with the forested and watered East, or the mountainous West, seemed impossible, but I had only to live on the Plains to yield to their compelling charm.

In the first place, the Plains are not flat but are rolling, and their sweeping undulations not only please the eye but appeal to the imagination by concealing what lies beyond each succeeding ridge. The ridges, in turn, give a breadth of view compared with which one's horizon at sea is restricted; and to this measureless expansiveness of the Plains, more than to any other characteristic, is due their

uplifting and exalting influence. No where else does one see so much of the world and yet seem so much a part of it.

After a sea voyage in a sailing vessel where, of necessity, one constantly watches the heavens, I have been impressed by the narrow outlook one has in a wooded region. But on the Plains, the atmospheric phenomena of half a continent seem spread around one, and because of the greater diversity of the surface conditions, they are far more varied than at sea. I have seen six distinct storms streaking the sky at the same moment, each one separated from the other by clear sky or variously colored clouds; clouds, too, such as one sees only on the Plains, for, after all is said, the glory of the Plains is their clouds.

If the life of a wooded country were as easily observed as that of the Plains, their faunas might be more readily compared, but we have as yet no complete census of even the vertebrate forms of a single square mile of forest; while on the Plains virtually everything above ground is visible as far as the eye can detect it; the herds of cattle and sheep; a bunch of antelope with heads up, watching keenly; a coyote sneaking off and looking back over his shoulder; a kit fox, trotting briskly and unconcernedly; a badger *flowing* over the grass toward his home; ground squirrels scurrying for their holes or sitting erect at the entrance and piping shrilly; all form part of the readily observable mammal-life of a typical Plains scene.

The last three weeks of June, 1908, were devoted by Louis Fuertes and myself to field work on the Plains about Crane Lake and Big Stick Lake, respectively about twenty miles east and twenty-five miles north of Maple Creek. The demands of special collecting and the shortness of the time, permitted us to gain only a general idea of the character of the avifauna as a whole, without attemping detailed studies of certain species.

When compared with that of Shoal Lake in Manitoba, the bird-life of Maple Creek region is distinguished first, by

the greater abundance of certain species, which are near their eastern limit in the first-named locality, (examples are, Western Grebe, Franklin's Gull, California Gull, White Pelican, Wilson's Phalarope, Long-billed Curlew); second, by the presence of plains or alkaline lake species, not observed about Shoal Lake, (examples are, Avocet, Western Willet, Ferruginous Rough-leg, Chestnut-collared and McCown's Longspurs, Lark Bunting, Sprague's Pipit); third, by the absence of those arboreal species which inhabited the poplars about Shoal Lake. Most of these, however, would doubtless have been found if we had searched the limited tree-growth along Maple Creek, or in the sand-hills, which dune-like occasionally arise in the Plains. Nor did we visit the timber of the "Cypress Hills," some twenty miles south of the town of Maple Creek, but examination of A. C. Bent's excellent list of the "Summer Birds of Southwestern Saskatchewan," (The Auk, XXIV, 1907, pp. 407-435; XXV, 1908, pp. 25-35), shows that most of the Manitoban birds are present, while, with them, is an interesting infusion of such western forms as the Red-shafted Flicker, Arkansas Kingbird, Say's Phœbe, Western Wood Pewee, Wright's Flycatcher, Bullock's Oriole, Pink-sided Junco, Arctic Towhee, Audubon's Warbler, Macgillivray's Warbler, Long-tailed Chickadee, Western Robin, and to this list may be added a Rock Wren, observed near Big Stick Lake, June 9.

The characteristic Plains birds in southern Saskatchewan are Chestnut-collared and McCown's Longspurs, Lark Buntings, Horned Larks, (*Otocoris alpestris leucolæma*), Meadowlarks, (*Sturnella neglecta*), Bay-winged Buntings, (*Poœcetes gramineus confinis*), and Rough-legged Hawks, (*Archibuteo ferrugineus*). All but the last-named are abundant, while the first four are flight singers, and there is virtually not a moment of the day when one or more of them cannot be seen or heard. The Meadowlark's flight song, though given as frequently as its perch song, earlier in the season, is less often heard in June, when the

bird commonly sings from a bush or from that apparently welcome innovation, a fence post.

The Longspurs and Lark Bunting sing in the air, in the most charming manner; not uttering their notes to the time of rapid wing-vibrations, but, having attained an elevation of from fifteen to thirty feet, the wings are held widely expanded and, facing the wind, the singing bird floats, lightly, gently, earthward, as though its buoyancy departed with its escaping song. It is an exquisite performance.

The Longspurs' songs are bright, cheery, tuneful bits of bird music, that of the Chestnut-collared suggesting a miniature of the Western Meadowlark's. But of this trio of floating songsters the Lark Bunting is the most distinguished. His song is truly a noteworthy effort, possessed of much volume and sweetness and recalling strains of the Song Sparrow, the Mockingbird and, especially, the Canary. At all times conspicuous, the male, when floating earthward with outstretched, motionless wings, becomes a striking figure, visible for a long distance; his colors a pronounced exception to those of most Plains birds.

Another contradiction in color is found on comparing the tails, in flight, of the Longspurs and Shore Lark; the former being conspicuously white, the latter black. Whatever end is gained by the white tail, whether of the "recognition," or of "signalling," it is assuredly not served by the black one; still, both birds live under the same conditions and are alike in general habits.

The marked change which occurs in the character of the bird-life as one reaches the lower ground bordering the sloughs, is not heralded by a corresponding change in flora. The alkalinity of the water is doubtless accountable for the usual absence of bushes and trees about the lakes, and one passes from the dry and perhaps parched plains into the mud and water of the sloughs, with only a thickening and lengthening of the grass which, in the water, gives way to small tulés.

The birds, however, respond at once to the altered conditions, and as we approach a slough, the Chestnut-collared Longspur and Meadowlark alone, of our Plains birds, remain common; the former slightly increases in numbers and to them are added Bartram's Sandpiper, trilling its weird flute-notes, while numerous Western Willets, Marbled Godwits, Long-billed Curlews, and Killdeer fly about one crying noisily.

About the border of the sloughs, are Avocets, most nervous and excitable creatures, Wilson's Phalaropes, Soras and several species of shallow-water, dabbling Ducks; Spoonbills, Gadwalls, Mallards, Pintail and Blue-winged Teal being the most abundant in the order named.

Bartram's Sandpiper on Nest

In the sloughs or lake borders, grown with tall grasses and tulés, the nesting birds are Western and Eared Grebes, Franklin's Gulls, Black Terns, Redheads, Canvasbacks and Ruddy Ducks, American Bitterns, flying about actively during the day, Coots, and Yellow-headed and Red-winged Blackbirds (*A. p. fortis*).

Finally, there are the birds of certain islands in the lakes, to which, according to the custom of ground-nesting colonial birds, White Pelicans, California and Western Gulls, and Common Terns, were confined, Wild Geese, as well as some of the slough border birds just mentioned being, in some cases, associated with them. In this land of

Young Long-billed Curlew

short grass, birds on the prairie or about the borders of the lakes, seemed double their real size. Pintail Ducks were often mistaken for Geese, while Geese when grazing, looked almost as large as yearlings!

The camper on the Plains is always confronted by the difficulty of finding wood and good water; but if he can supply his own bedding, he will generally find a home wherever there is a ranch. Scott's sheep ranch at Crane Lake and Baynton's at Big Stick Lake gave Fuertes and myself not

only a cordial welcome but, by information and the use of boats and horses, material assistance in our search for birds. At Scott's we occupied a wool shed within a few yards of the corral into which two thousand sheep were driven nightly, while awaiting their turn in the shearing pens. The experience gave us a lasting conception of the vocal abilities of sheep and lambs, nor will we forget a certain turkey gobbler who, with a regularity that an alarm clock might envy, and a frequency of repetition it could never hope to equal, made memorable the early hours of the day. We were closely associated also with numerous hens and roosters, cats and sheep dogs, while thirteen young Wild Geese were the tamest and most confiding creatures on the ranch. They were hatched from sets of seven and six eggs which had been taken from the Goose nests and placed under hens two days before the young appeared. On June 13, when first they sought our acquaintance, these goslings were about two weeks old. They acted as one family and were followed about by a solicitous Plymouth Rock hen to whom they paid not the slightest attention. On one occasion, possibly stimulated by contact with the water of a small puddle, they showed some signs of fear, diving and running in an excited, erratic way; but at other times, they fed peacefully about the house, displaying so much confidence in man that whenever they chanced to see us using a wash basin, they all attempted to occupy it at the same moment, conclusive evidence that with Geese, love of water is instinctive and fear of man acquired. Nevertheless, a single day with the parent Goose would probably have made them Wild Geese in every sense of the word.

Flocks of from five or six to thirty Wild Geese were seen daily, but the two pairs which nested on a small grassy island at Scott's ranch, were the only ones known to breed; and here, in spite of the fact that their eggs are always taken, Geese nest yearly. The island is about two hundred yards long and half as wide, and not more than one hundred

and fifty yards from the shore. But this narrow strip of water is a sufficient protection against coyotes and, in addition to the Geese, about a dozen Ducks, chiefly Gadwalls, a hundred or more Common Terns and several hundred Ring-billed and California Gulls nested there.

The Terns' nests were scattered—one was placed in an old Goose nest—but those of the Gulls were thickly massed

Young Wild Geese

at one end of the island; the Ring-bills occupied the higher ground, while the California Gulls were nearer the water and built higher nests. The eggs of the latter species were apparently the first to hatch, young being observed on June 14. These birds were far from shy and on being approached, merely rose in the air where, facing the wind, they hung suspended, all calling vociferously. So closely did their position depend on the direction of the wind that one could walk

around the flock of clamorous birds, viewing first their heads then their tails, without their attempting to face the cause of alarm.

The California Gulls on Shoal Lake, devoured the eggs deserted by White Pelicans, but neither on Crane Lake nor on Big Stick Lake, where another large colony was found,

Ring-billed and California Gulls

were the Gulls observed to prey upon the eggs of other species. At the latter place, they gathered the crumbs which fell from the Pelicans' table and did not hesitate to drive the great birds from their own board.

I did not succeed in learning to distinguish these Gulls by their notes alone, although there is a difference in their voices; nor could I determine the significance of their various calls, as, with head down or again with head pointed upward, they uttered their characteristic *kow-kow-kow,* or *kee-ow.* A harsh *cuk-cuk-cuk* appeared to be a note of alarm, while a call in which the syllables *oo-eek, oo-eek* were prominent, was more in the nature of a song.

About the borders of the colony, the parent birds led their young into the lake to bathe; both young and old ducking their heads into the water repeatedly, buoyantly, with evident joy in the performance.

June 19, we launched a small patchwork box—it could scarcely be called a boat—at the ford on Bear Creek and floated down to Crane Lake. This was a thoroughly enjoyable experience. The creek averages not more than twenty feet in width but is deep and the current bore us swiftly. Rose-bushes, or an occasional willow which invariably held the nest of a Rough-leg or Swainson's Hawk, appeared now and then on the banks, but for the greater part they were as bare as the Plains themselves. Ducks jumped, at nearly every turn in the creek, and there were Sharp-tailed Grouse in the rose-bushes, but it was not until we entered the marshes and tulés at the mouth of the creek, that we reached the center of abundance of the bird-life of the region. Here were snowy banks of White Pelicans and the elusive Western and Eared Grebes, the former uttering their characteristic grating whistle, while to the latter we attributed a loud *kow-kowing,* singularly like that of the Pied-billed Grebe. Franklin's Gulls passed us on bounding, billowy flight or paused to circle curiously, and there were a few nervous Black Terns. But Ducks and Geese were the dominant species. The Geese, alert but dignified, watched us with necks upstretched and were quickly convinced of our undesirability. The Ducks took to the air when only their own safety was concerned, but where a family was involved, they fluttered painfully about, now before, now behind, and the less attention we paid to them the more they paid to us. The quaint, bobbing, gay little Ruddy Ducks, with their rich, brown plumage, bright blue bills, and tails cocked forward, took wing only when closely pressed and then sped away in bumblebee-like flight into the lake.

Their courtship is evidently conducted on the water, but the Gadwall pursues his mate in the air, going at full speed

"Facing the wind, they hung suspended"

and twisting and turning with the erratic flight of a Barn Swallow. Besides these two Ducks, there were also Mallards, Baldpates, Blue-winged Teal, Shovellers, Pintails, Redheads, Canvasbacks, Lesser Scaups, Buffleheads, Coots, American Bitterns and Yellow-headed and Red-winged Blackbirds.

Young Gulls

The locality and its bird-life have been well described by Bent and Job, who on June 17, 1905, estimated that "at least 150 pairs of Ducks were breeding or preparing to breed" (The Auk, XXIV, 1907, p. 417), on an island of about four acres, which here terminates the reedy growth. But the following year, only three nests could be found and we discovered less than six. A coyote and a pair of minks were believed to be responsible for the decrease, but the cutting of the grass by a neighboring ranchman doubtless also disturbed the birds.

I devoted my time here solely to collecting material for a group of Western Grebes. The birds, their nests, eggs and

young could be secured without difficulty, but I frankly confess that although every means I could devise was used to secure satisfactory photographs of the birds themselves, the effort failed.

The instinct of incubation is apparently too poorly developed to make the nest a lure, while the shyness of the birds, the instantaneousness with which their diving habits enable them to disappear, and the denseness of the tulés among which they lived, all militated against success. Whatever was learned of the habits of the bird, as it was observed both here and on Big Stick, has been incorporated in my notes on this species in the preceding chapter.

Black Terns

THE MOUNTAINS

Most visitors to the Canadian Rockies, who give any thought to the subject, leave them, I think, with the impression that they are unusually deficient in bird-life. This belief is due, doubtless, not so much to the restrictions of the avifauna as to the overwhelming grandeur of the region itself. The hurrying tourist, and few there are, unfortunately, who do not hurry, is kept in a state of intense enthusiasm by what is probably the most impressive scenery he has ever beheld, and from the time he enters the mountains until he leaves them, his outlook never lacks a view which is not worthy all the homage his nature is fitted to render to it. Small wonder, then, that he has no time to look for birds; and if he does not look for them he will not find them.

So far as bird-life is concerned, conditions here are essentially primitive. There is a settlement at Banff, but, beyond this, the Canadian Pacific railway buildings and hotels are almost the only evidence of man's occupation one sees in the mountains. These hotels, erected for the benefit of sight-seeing tourists, permit one to step from the train into the heart of the forest primeval, and find excellent accommodations. There are, therefore, no orchards or stubble-fields, or other artificial conditions favorable to the increase of those birds which readily adapt themselves to the ways of man and thrive on his bounty. Nevertheless, many birds inhabit these great coniferous woods, but the height of the trees and density of the undergrowth afford them opportunities for concealment. They are consequently more often heard than seen, and if one's ear be not attuned to their voices, they will doubtless pass unnoticed and one will have missed hearing some of our best songsters, under conditions which would make the experience memorable.

Burroughs long ago wrote of the " serene exaltation of spirit " occasioned by the song of the Hermit Thrush, and when one is already thrilled by the majesty of the snow-crowned mountains and awed by the grandeur of the forests, the calm, pure, heavenly hymn of the Hermit reaches chords in one's nature untouched before.

Throughout this region, the Hermit, (*Hylocichla guttata auduboni*) is a common bird, its song season lasting until the end of July, while the Olive-backed Thrush (*Hylocichla ustulata* subsp.), which, as a songster, is not far behind him in rank, is even more common. The Western Robin, which differs from its eastern representative only in the absence of white on the tips of the outer tail-feathers, a third member of the Thrush family, is also generally distributed and shows a ready disposition to abandon its forest ways for a home about the haunts of man. At Glacier, to this trio of Thrushes is added the Varied Thrush, a bird of striking appearance and remarkable voice. As large as the Robin, the back is gray, the underparts rich brown, with a broad black band crossing the breast. The song of the Varied Thrush cannot be compared to that of any other bird whose notes are known to me. It is the song of the wind, sung by a bird; a single, long-drawn, double-toned, wonderfully vibrant whistle of one note. When the singer is near, it rises with swelling resonance until the woods echo with its singular *timbre,* then dies away without once conveying a definite idea of the bird's whereabouts. In a moment or two it is repeated, now in a different key, but always with the indescribable ringing quality which makes it unique among the songs of American birds. He who actually sees the bird in the act of singing, may count himself fortunate. Indeed, in the forests about Glacier, the bird is at all times difficult to discover. Here, from July 18 to 20, 1907, we heard at least fifty Varied Thrushes, but did not see one. On a former visit, later in the month, they frequented the lawn before the hotel to gather food for their still unfledged young; a strik-

ing response by this elusive forest dweller to the advances of civilization.

In July, 1901, on my first visit to Glacier, a pair of Barn Swallows, after the charming manner of their kind, were giving a more complete evidence of their confidence in man, by attempting to build a nest beneath the hotel piazza. The conditions, however, were evidently novel and the mud would not stick on the smooth face of the rafter which had been selected as a site. I ventured to nail up a cleat by way of foundation. The assistance was accepted in good part and the nest was completed. In 1907, I found a pair of Barn Swallows nesting where I had left either them or their predecessors six years before.

Trilling Juncos, slightly browner than the eastern bird, are common at the edges of the wood along the railway track and particularly about the stables attached to the hotels. With them may be found Intermediate White-crowned Sparrows, whose plaintive song of five notes, so singularly suggestive of the song of the Black-throated Green Warbler, is here one of the most characteristic bits of bird music; and from the tangle of fallen tree-tops, the song of the Western Winter Wren, trickles out like the voice of a hidden brook.

At Laggan, the Fox Sparrows, singing gaily, succeeded as few birds can, in making dark days seem bright and cheerful, while from the tree-tops, the Ruby-crowned Kinglet played his magic flute and the Olive-sided Flycatcher called his emphatic "Come up *here.*" The Solitaire, a distinguished figure in the list of American song birds, was not uncommon at Laggan, but only once did I hear the ecstatic carrolling which takes the bird from its feet, high above the tree tops. This was at timberline where the bird seemed lifted by the force of its song, not only above the trees but above the mountains tops, above the very earth itself. In July these are the leading members of the feathered choir in the Canadian Rockies, which it is evident, contains

some of the most gifted songsters in America. The less musical or more quiet species which I have observed at this season, include the Spotted Sandpiper, Richardson's Grouse, Golden Eagle, several species of Hawks, Kingfisher, Raven, Canada Jay, Rocky Mountain Jay, Pine Finch, Chipping Sparrow, Violet-green Swallow, Bank Swallow, Yellow, Audubon's, and Golden Pileolated Warblers, Chickadee and

"A strange, plump little figure"

Columbian Chickadee, Arctic Bluebird, and Dipper. Of this anomaly among birds, this diving Thrush, I found a nest late in July, 1901, in a rock fissure overhanging the rushing waters of Fish Creek, at Glacier. It contained five young, nearly fledged, which the parents fed as I sat within a foot of their home.

Swollen by the rapidly melting snowfields stretching down from Asulkan Pass, the stream dashed by with so great an uproar, that the human voice was inaudible from bank to bank, a distance of not more than twenty feet, but

Nest of Dipper
"In a rock fissure, overhanging the rushing waters"

the pebbly note of the Dipper penetrated the thunder of the waters sharply and clearly. A strange, plump little figure he was, bobbing on a rock, barely above the turmoil of foam, his white-marked eyelid flashing with each wink.

The young were fed on insects, doubtless larvæ gathered from the bottom of a tributary brook, up which the birds flew for a fresh supply. They never crossed the land, but with the whirring wings of bumblebee-like flight, followed

every bend of the main stream to leave it at right angles and pursue an equally water-governed course to the feeding-ground.

The bird-loving tourist may find all the birds mentioned, and many others, virtually at the door of his hotel, but this is not all the region has to offer him. By ascending those mountains which reach above timberline, here at about 7500 feet altitude, he will enter another world with a new fauna and flora, leaving behind him all the forest-haunting birds, and finding others not one of which he has seen below. He will leave behind, too, the hotels and some inharmonious elements of human life for which they are responsible. The morning we left Lake Louise for Ptarmigan Pass, fifteen miles to the north, a westbound Convention was taking possession of the place, and I have often wondered how many times my party of artist and guide, with our five horses, was photographed before we crossed the railway at Laggan.

We forded the Pipestone, (now bankfull and flowing with almost force enough to take the horses off their feet), just above its junction with the Bow, making no doubt a fine subject for the last of the kodak-snapping conventionists who, not concerned about *our* photographic apparatus, doubtless enjoyed the experience more than we did.

Passing through the Murray pines of the river valley, we began the ascent to the Ptarmigan Lakes, camping that afternoon in the Engelman spruce, and Lyall's larch, at timberline, just below the mouth of Ptarmigan Pass. The view from this point gave a new meaning to the word "indescribable." The mountains across the Bow Valley to the south —Temple, the peaks of Moraine Lake, Hungabee, Lefroy and Victoria—form perhaps the most beautiful and impressive group in the Canadian Rockies. To climb them and explore their passes and deeply cut valleys, is a thrilling experience, but it is like viewing a play from the stage; to see this stupendous array of snow-clad peaks, one should ascend the mountains to the north, in themselves comparative-

ly insignificant, but giving a breadth of vision which brings the whole sublime panorama before one in a single view.

From the bird student's standpoint, we were exceptionally fortunate in our choice of a camp-site. Solitaires, Hermit Thrushes, Robins, Kinglets, White-crowned Sparrows,

The Ascent to Ptarmigan Pass

Juncos, Fox Sparrows and Audubon's Warblers, represented the forest avifauna above our tent, but five minutes' climb took us beyond their limits into the Arctic-Alpine zone. The change would not be more complete if one should travel through twenty degrees of latitude, at sea level.

It was the height of Alpine spring. Bits of azure water marked openings in the ice of the more exposed lakes. The saturated meadows were thickly starred with buttercups. Anemones clustered about the borders of the rapidly shrinking snowfields, and on the rocky slopes, heath and heather, killikinick and *Dryas,* bloomed luxuriantly.

The mercury passed below the freezing point nightly, skimming the newly opened water with ice; snow, sleet and hail-storms raged violently if briefly, but the flowers smiled bravely through the frost crystals, with not so much as a wilted petal to show for the experience.

I had come to this "top of the world" to make studies and secure material for a group of Arctic-Alpine birds, notably the Rosy Snow Finch, (*Leucosticte tephrocotis*), and White-tailed Ptarmigan, (*Lagopus leucurus*). No birds could emphasize more strongly the boreal character of the life of these mountain summits. Snow Finches are found at sea-level only north of the sixty-eighth degree of latitude and extend southward, above timberline, in the Rockies, to Colorado, where they nest at 11,500 feet altitude, and in the Sierras, to Mount Whitney, California, where they summer as low as about 9500 feet. They are said not to descend below timberline during the summer, but we noted a striking exception to this rule at Lake Louise, where numbers of them came regularly to feed, about the forest-surrounded stable. They were evidently attracted by the fallen grain and may have learned of this supply of food during the winter when the heavy snowfall drives them to lower levels.

The Ptarmigan is a characteristic circumpolar type which also finds a congenial home in comparatively low latitudes at correspondingly high altitudes, ranging, in the Coast Range, as far south as Oregon, and in the Rockies reaching northern New Mexico. Its distribution is not continuous, there being many breaks in the Alpine portions of these mountain chains, such, for example, as separate the Rockies of Colorado from the main chain to the northward. The Ptarmigan of Colorado and New Mexico, therefore, cannot have acquired their present distribution by extension of range southward under existing conditions, but are evidently to be classed with the group of northern plants and animals, which, brought south during the Glacial Period, were left stranded on Arctic-Alpine islands by the retreating ice.

Still, we observe that the Ptarmigan of Colorado are the same as those of the Canadian Rockies, evidence that the birds have undergone no change since the time when their distribution was continuous.

Camp at Ptarmigan Pass
Mt. Temple to the south

In color as well as in distribution, Ptarmigan are of exceptional interest. The fact that they are snowy white in winter and mixed brown, gray and black in summer is common knowledge, but it is not generally known that their plumages are even more closely adapted to seasonal conditions than the striking change from white to brownish would imply. Thus, in the spring, the females molt before the males, at times acquiring their inconspicuous nesting costume before the male has lost a feather of his winter dress. In winter, both sexes are white, but in summer, the female is more quietly attired than the male, who retains a few white

feathers sprinkled through the gray and brown ones he has lately acquired.

The danger from attack by Falcons, Goshawks, Snowy Owls, and various predaceous mammals, to which the absence of cover in their environment exposes them, requires,

American Pipit on Nest

however, still further adaptations. In that physiological cycle of events comprising the bird's year, a complete renewal of the plumage by molt is required immediately after the close of the breeding season, when the bird passes into winter plumage. If, however, the Ptarmigan should follow this custom, it would don its white garb before the coming of snow and be rendered fatally conspicuous. In defiance, therefore, of the laws of molt, the bird does not acquire the usual winter dress, but a gray supplemental or supernumerary plumage, evidently designed to carry it over the snowless period, from the end of the nesting season in late July or early August, to the snows of September or early Octo-

ber. This plumage appears only on the exposed portions of the bird's body and is followed in October by the pure white winter dress. The case is one of the best arguments to be found among birds for the value of, and necessity for protective coloring.

A Pair of Ptarmigan

I had never seen a living Ptarmigan and an unsuccessful search for them in Colorado had sharpened my already keen desire to meet this strongly characterized bird on its native heather. But the following morning, anticipations of finding Ptarmigan were by no means my only cause for exhilaration as I passed easily over the crisp snow crust, formed during the night. There was the inspiring, elemental grandeur of the mountains, the grateful sense of utter isolation, and the primitive abundance of certain forms of life. Dozens of great hoary marmots, surprised at their root-digging, galloped back to their caves, scuttling

over the ground until they were within diving reach of their own doors, when they stopped, sat up and whistled shrilly; hundreds of ground squirrels piped from the meadows and, from the rock slides, the pika or little chief hare, uttered a call singularly like the sound produced by blowing on a blade of grass held between the thumbs.

Ptarmigan on Snow

Snow Finches in scattered companies, fed restlessly about the border of the snowfields, or gathered insects which had fallen on the snow itself. It was only when on the snow, or when while in flight they called their crossbill-like *chuck, chuck,* that they were easily observed.

Pipits fed on the meadows, or rang the little bell of their flight song, from high in the air, and, finally, my willing ear caught a new note, a loud, high, squealing, crowing call, followed by a chattering, chuckling *chut-chut-chut,* which could have been uttered only by a Ptarmigan, and I was just in time to see two birds alight near the base of a rock slide. The spot was reached as quickly as the nature of the ground

Male Ptarmigan

"As long as he holds his rigid, statuesque pose, he is simply a lichen-covered rock"

would permit, but no Ptarmigan could be found, and if an additional *chut* had not given a clue they might readily have remained unseen.

With great caution I advanced to within about sixty feet, now for the first time seeing the female, and opened fire with a fourteen-inch lens. Plates were then exposed at diminishing distances until I was actually within reach of the birds, which proved to be tamer than barnyard fowls. The first evidence they gave of being aware of my presence, was to remain perfectly motionless, then, as I made no further advance, they attempted to combine action with rigidity of pose and were almost successful in achieving this impossible feat. With painful slowness, one foot was placed in advance of the other, at the rate of about three steps to the minute. If I drew so near that the birds seemed convinced that they were seen, the male assumed a more alert, bantam - like attitude, ducking his upraised head and flirting his tail as though inviting me to conflict.

The pose of the female was more hen-like, and less aggres-

Male Ptarmigan Walking in Water

"The little brown bird in the heather"
Ptarmigan Lake in the background

sive. She showed virtually no concern when I was within three feet of her, feeding about the rocks, and even stopping to scratch her head. After an hour or two, the male became more accustomed to me, and seemed as much at ease as his mate, uttering a low, crooning note suggesting that of a comfortable chicken on a sunny day.

Convinced that this female had a nest somewhere in the immediate vicinity and was out for an airing with her mate,

I determined to watch them until their morning walk was concluded. But at the end of three hours, my artist-companion, Louis Fuertes, arrived, with news of the discovery not only of a Ptarmigan's nest but of that of a Pipit, also.

I had long before exposed my last plate on the singularly tame birds with which I had been spending the morning, but sad experiences with birds' nests left until "to-morrow,"

"Almost permitted us to stroke her"

induced me to return to camp for a fresh supply and at once follow my fortunate guide across a snowfield—where a bear had preceded us the night before—to be introduced to the little brown bird in the heather.

No photographer ever had a more patient sitter. Without audible objection, she permitted herself to be pictured from this side, then from that, and almost permitted us to stroke her as she sat on her five speckled eggs.

But a touch broke the spell of her astonishing stillness, and she fluttered off a few yards only to become motionless again. Herein lies the secret of the invisible cloak which these birds wear. It is not alone their faith in it that counts. All ground inhabiting birds exhibit this confidence in the

Ptarmigan on Nest

protective value of the dull-tinted costumes to a greater or less degree. In the gallinaceous birds it is most highly developed, but none, in my experience, equals the Ptarmigan. The mottled male, with more or less white and black in his plumage, might be thought a rather conspicuously marked bird, but as long as he holds his rigid, statuesque pose, he is simply a lichen-covered rock. Doubtless we passed within a few feet of numbers of them and were none the wiser.

The data obtained on this, our first day's outing, was sufficient to insure the successful accomplishment of the object of our expedition. The haunting thought of failure was

banished and the rest of our stay was occupied with the study of details and the collection of accessories. It was a journey of only five hours back to Lake Louise, but we seemed to have returned from a far country.

Female Ptarmigan

THE WHITE PELICAN*

Pelicans are familiar to most of us as absurdly dignified, ungainly inhabitants of zoölogical gardens; but it is perhaps hardly fair to judge them in an environment for which they are not responsible.

While in nature we shall not find Pelicans endowed with that degree of intelligence and responsiveness which distinguishes certain birds higher in the evolutionary scale; they, nevertheless, possess their own unequalled attractions.

However awkward White Pelicans may appear in captivity, when on the wing, they display a superb mastery of the air. I know of no birds which in flocks present so grand a sight. TheMan- o'-War Bird is the epitome of grace and repose, in motion. A flock of Flamingos is thrilling, vivid, spectacular, but a flock of White Pelicans is indescribably majestic and impressive.

I recall a gathering of four or five hundred of these birds, which, one blustery June day, in Saskatchewan, had left the troubled waters of a shallow lake to rest upon the prairie. In the distance, *en masse,* they could not have been distinguished from a patch of snow. As our wagon approached, they arose, all flapping heavily, their wing strokes strongly emphasized by the now exposed black flight feathers. For a few moments they seemed to be in confusion, but unity of movement was quickly developed, and the whole flock, densely massed and gleaming with strange whiteness against the dark, threatening sky, moved toward the lake.

The direction of flight seemed well established, when a single bird left the flock, flying at right angles to the left.

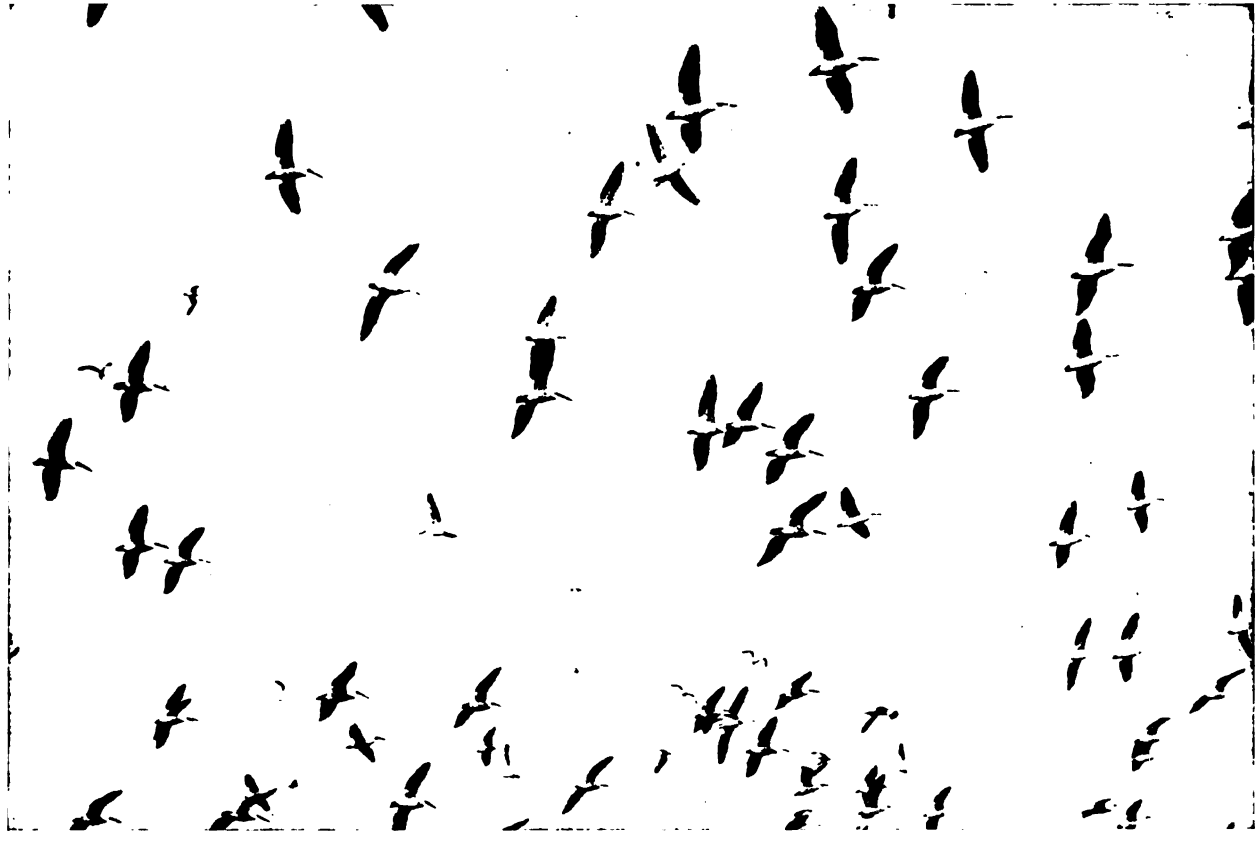
* Although some of the observations herein recorded were not made in Canada, it seems desirable to include this chapter in a part of the book which relates to a region in which the White Pelican is probably most numerous.

The others swept on, but they had gone only a few yards when one or two, then dozens and, finally the whole flock turned to follow. It was a fine example of acknowledged leadership. Then with the superb grace, power, and dignity which so distinguishes them when in the air, the birds, on set, expanded wings, began to soar, sweeping in broad circles higher and higher, until from the snow-bank of the prairies they faded into a flurry of whirling snowflakes in the clouds.

We must also accord to Pelicans that respectful attention which is the due of extreme age. Pelicans became Pelicans long before man became man, a study of the distribution of the eleven existing species leading to the conclusion that at least as late as the latter part of the Tertiary Period, our White Pelican, and doubtless also other species, presented much the same appearance that it does to-day.

Of the eight Old World species, the one inhabiting southern Europe so closely resembles our American White Pelican, that early ornithologists regarded them as identical. Nevertheless, the localities at which their ranges are nearest, are separated by some 8000 miles. Such close resemblance, however, is neither an accident of birth or breeding. Pelicans did not appear independently in the two hemispheres. Birds so like each other and so unlike other existing birds, must have had a common ancestry. Common ancestry implies, at some time, continuity of range, and with the European and American White Pelicans, we may well believe this to have occurred in that later portion of the Tertiary Period, when a warm-temperate, or even sub- tropical circumpolar climate existed. At this time, the Pelican, from which we assume that the European and American White Pelicans have both descended, inhabited the shores of the Arctic Ocean.

Eventually, by those climatic changes resulting from a continuously decreasing amount of heat, and culminating in the Ice Age, the individuals of this hypothetical Polar Peli-



"Sweeping in broad circles"

can, were forced southward, some in Europe, some in America, but whether at the same time or not is unknown.

Should some swing of the temperature pendulum ever re-establish the pre-glacial polar climate, the European and American Pelicans, following in the wake of an advancing favorable isotherm, may meet again on the shores of the Polar Sea, whether as two species or one, who can say, but in the meantime we look on them with special interest as but slightly differentiated from the bird which fished in the Arctic Ocean before, so far as we know, man appeared upon the scene.

The White Pelican's congeners in America are the distantly related Brown Pelican and its southern representative, the Chilian Pelican. Both are maritime birds of tropical shores. The former is abundant on the Florida coast, and ranges northward to the Carolinas; while on the Pacific side, where it appears with a reddish, instead of olive pouch, it is found regularly as far north as San Francisco and even Point Reyes. Both are only one-half as heavy as the White Pelican, which, with a weight of sixteen pounds, a wing expanse of eight and one-half feet, and a body of greater proportions than its weight would imply, may claim to be one of the largest of North American birds.

The adaptability to climatic conditions to which possibly the White Pelican owes its continued existence, in the face of changes to which doubtless many other birds have succumbed, enables it to thrive in widely separated and totally unlike portions of our country. The presence of this bird in Saskatchewan, for example, indicates that it more closely approaches the home of its assumed Arctic ancestor, than is commonly supposed. In truth, White Pelicans go as far north as Great Slave Lake, at latitude 61 degrees, each year, though their most northern known nesting-place is Fort Smith in latitude 60 degrees. Nor are these the only birds of their kind in this region, British America, east of the Rockies, as far at least as Shoal Lake, forty miles northwest

of Winnipeg, being their known eastern outpost. In many of the numberless lakes of Manitoba, Saskatchewan, and Alberta, invariably upon islands, White Pelicans nest; a colony containing anywhere from a dozen to several thousand birds.

While early writers tell us that the White Pelican was at one time more or less frequently seen in our North Atlantic States, there is no record of its ever having nested east of the Mississippi. In western Minnesota, Pelicans nested as recently as 1878, and they doubtless also reared their young at favorable localities in the northern plains states, but the most eastern colony breeding in the United States to-day, is found in Yellowstone Park. West of the Rockies, in the Great Basin, there are Pelican settlements on islands in Utah Lake, Utah; and in Washoe and Pyramid Lakes, Nevada, while a great number nest in Lower Klamath Lake on the California-Oregon line and probably also on other lakes of eastern Oregon.

In California, they make their home in Eagle Lake in the northern Sierras, and, until it was drained in 1904, they nested on Kern Lake at the southern end of the San Joaquin Valley, and I am told that the year after its formation, a company of these birds took possession of an island in the Salton Sea. These birds, therefore, have not only established the most southern breeding record of their species, but they have also established a record of intelligence in the deliberate selection of the only type of home in which it is possible for Pelicans to rear their young.

Conspicuous because of their size, color and gregariousness, adult Pelicans would be a shining mark for the predaceous animals of the mainland, while the fact that the young Pelican cannot fly until he is at least two months old, indicates how little chance he would have of reaching this age should his parents select a mainland home. The security afforded by an island is therefore as essential to the continued existence of the Pelican as it is to other

colonial, ground-nesting birds. It has, however,. always been my belief that such island colonies were not the result of an actual, definite selection but that they were formed cumulatively, through the instinctive return of the young to the place of birth in which their parents had chanced to settle; while those birds which took up their abode on the mainland, were either themselves destroyed or, in any event, never succeeded in rearing their young. But the birds which are reported to have occupied this newly formed island in the Salton Sea, showed their evident appreciation of the desirability of an insular home, and in Saskatchewan I found evidence of this same type of intelligence.

In the summer, therefore, the White Pelican is an inhabitant of fresh water lakes and the latitude to which it has extended its range, shows that it has reacquired some of the territory it was forced to abandon during the maximum development of the Glacial Period.

In the winter, however, the White Pelican is chiefly a dweller on salt water. Some individuals spend this season in the lakes of the Mexican tableland. The greater number, however, winter along the coasts of southern California—and particularly in the Gulf of California at the mouth of the Colorado—south to Guatemala; they are also found along the shores of the Gulf of Mexico, from the mouth of the Mississippi south to Mexico on the west side, and to Cape Sable, at the extreme tip of Florida, on the east side. On the east coast of Florida, it is a singular fact that White Pelicans appear to spend the winter only in the Mosquito Lagoon. On one occasion, I saw three of these birds passing up the coast at Palm Beach, presumably *en route* to the one spot on the Atlantic seaboard which they are now known regularly to frequent.

In the commonly accepted meaning of the word, the White Pelican is not a game bird. Its flesh is useless for food, and it will neither "flush" nor "stool;" but I can commend it to the camera hunter as a quarry in every way

worthy of his most ardent endeavor; while to the ornithologist, it goes without saying, it is species of exceptional interest. When, therefore, I add that my own pursuit of this splendid bird has been made in the dual role of naturalist and photographer, it may be imagined that a chase which has covered parts of a period of six years has brought me no small amount of pleasure and, I may add, at times a corresponding measure of disappointment. Eventually, however, I reaped the reward which generally comes to most of us if we are given enough time in which to try for it.

My first visit to the home of the White Pelican resulted disastrously for the bird and bade fair to end my experiences with its kind in the first chapter. It was on Shoal Lake, a treacherous bit of water, some thirty miles long, lying between lakes Winnipeg and Manitoba. While encamped on its shores, during June, 1901, I was led to believe that White Pelicans seen daily were nesting on a small bar or " reef " reported to exist five or six miles out in the lake, too far to be visible from land. The only boat available was a punt, hardly large enough for two passengers, and designed to push around in the quill reeds, which grow densely at the border of the lake. It was long past the age when retirement from service was its too obviously withheld due, but the lure of the great white birds minified its defects; the voyage was made, the island reached and the birds found.

I had now no doubt of the success of my attempt to photograph these before unpictured creatures, and to study their habits under unique conditions. A group containing six of the twenty-seven nests on the islet was selected, and an umbrella blind was concealed in a small patch of reeds growing in a foot or two of water. I entered it, focussed my camera on the nearest nests, on which in imagination the birds were already sitting, and waited. At the end of an hour the birds returned, wheeled over the island at a considerable height, evidently took in the situation and disappeared to return no more.

In the meantime a storm which on shore occasioned both loss of life and property, developed, and we found it impossible to leave the island. A tent-fly, brought for such an emergency, was rigged over a pole supported at one end by a camera tripod and at the other by crossed oars, and my boatman and I passed the night clinging to this pole to prevent our shelter from being blown into the lake.

"A tent-fly . . . . supported at one end by a camera tripod"

A Pelican's nest of heaped up sand and pebbles offered the only seat not under water and, after removing the three eggs it contained to another nest, I gratefully occupied it, with thanks to the bird whose instinct had prompted it to build a home so far above water level.

Toward morning the thunder and lightning ceased and the rain showed less resemblance to a deluge, but the head wind continued. We could not induce a fire to burn and we

were not provisioned for a siege, but before the situation became unpleasant, the wind fell, shifted in our favor, and we reached the mainland to the no small relief of those awaiting us.

Nine days later, I made the trip again, but only to find that the Pelicans' eggs had been eaten, doubtless by Gulls, six pairs of which were also nesting on the island. The experience was not only thoroughly disappointing, but sadly

Pelican's Nest, Shoal Lake

enough it induced three young ornithologists to venture to the same "reef" two years later in search of Pelicans' eggs. Less fortunate than we were, they encountered one of the violent storms so characteristic of the region, and when still far from the islet their boat filled, and two of them were drowned.

The change from the mosquito-infested sloughs and lakes on the prairies of showery Manitoba to the desert sagebrush, and mountains of arid Nevada is so great that but few birds are common to both regions. Pelicans, however,

ask only for fish and an island remote from man. It matters not, apparently, whether the island be baked in the torrid heat of the Salton Desert or cooled by the sub-arctic breezes of Great Slave Lake, or whether the fish are the tasteless pickerel of muddy Shoal Lake, or the delicately flavored trout of sparkling Pyramid Lake, whose praises Fremont sang when long ago he made this beautiful sheet of water known to the world. Insular seclusion and food are the requisites, and these are found in so marked a degree on Anahao Island and in the surrounding waters of Pyramid Lake, Nevada, that the largest known colony of White Pelicans exists there.

In Pelican annals, this is historic ground. Here, in May, 1868, Robert Ridgway, while naturalist of Clarence King's Survey of the fortieth parallel, found White Pelicans nesting in great numbers and added much to our then scanty knowledge of this species; particularly in regard to the shedding of the horny keel-like knob which appears on the upper mandible of the Pelican prior to the nesting season and is shed after the eggs are laid.

The Shoal Lake experience whetted my appetite for Pelicans, and Ridgway's published report, induced me to lay plans for Pyramid Lake as possibly still a resort of this wary species. They matured in July, 1903. On the sixth of that month, with Dr. C. Hart Merriam, Louis Fuertes, and two other naturalists, I drove from Wadsworth, forty miles north over the sage plains and under the great cottonwoods which border the Truckee, to a small road house half-way up the western side of the lake. The whole region is contained in the Piute Indian Reservation and, beyond the houses at the agency near the southern end of the lake, this road house was the only one seen occupied by a white man.

Pyramid Lake is a marvelously beautiful body of water. It is surrounded by treeless mountains, whose strongly modelled contours mirror the purple shadows of the illusively clear desert air, and emphasize the atmospheric effects over and beyond the lake's ultramarine waters.

The lake is thirty miles long, and ten miles wide, opposite our lodging. When we reached its shores, a storm which had forced our one hundred and twenty-five foot steamer on Lake Tahoe to abandon part of her trip, was still raging. Long, curling, crested waves came rolling in, to break on the beach in a manner creditable to the sea shore. We looked at the troubled waters, at the roughly made, flat-bottomed punts, the only available boats, and at Anahao, the assumed island home of the Pelicans, seven miles from our shore—and decided to wait.

Young Pelicans, Anahao Island

The Indians assured us that if we did succeed in reaching the island we would certainly be killed by rattlesnakes, and the long anticipated meeting with Pelicans seemed somehow to lose much of its charm. Incidentally it may be remarked that in the end we found abundant ground for the Indians' statement. But the next day, the wind had gone, the lake smiled in the sunlight, our apprehension decreased, our desires increased, and early the following morning, provisioned for a stay if need be, we embarked in three boats and, after nearly three hours rowing, reached the island. It

is somewhat over a mile long, and half a mile wide; with a central mass of tufa, some five hundred feet high, fringed by fallen rock. As yet we had seen no Pelicans on it, but, when climbing a rocky divide I looked over into a snowy mass of them, my exultation could be measured only by the time and trouble the journey to my view-point had required.

Anahao is too big to be seen at a glance, however, and during the day when we completely covered it, eight distinct colonies of Pelicans were found, containing in all, 4000 young Pelicans and one hundred and eighty-nine eggs. The young ranged in age from those just hatching to others which were beginning to acquire their wing-feathers. Generally speaking, all the young of one colony were approximately the same age; suggesting that the various groups formed quite distinctive villages, and conducted their affairs wholly independent of one another.

As I went from colony to colony and the old birds deserted their young to fly out of sight up the lake, I began to realize that it is one thing to reach a Pelican settlement and quite another to learn something of the ways of its inhabitants. In vain I crawled into crevices in the rocks or hid myself in caves, the adult birds would reconnoitre the ground in some instances, but would not return to their homes and in the end I left with only such information as could be gathered from casual observation of the young and their nests.

The latter were slightly heaped mounds of dirt and pebbles, hollowed at the top, much like the nests found on Shoal Lake. The young, when hatched, are ruddy flesh color and practically naked. Shortly after birth, a snowy white down appears, which almost completely covers the body when they are between two and three weeks old. Unlike the Brown Pelican, they are comparatively silent, their only note being a low, coughing, whining grunt. Their appearance is far from prepossessing, and is not improved by their habit of greeting visitors with wide open mouth and snapping bill.

The desertion of the young, without regard to age, by

the parents, indicates a surprising lack of parental solicitude. Had the old birds shown half the spirit of a Catbird or Robin, an invasion of their homes would have been a serious affair; but their haste to make good their own escape gave us no opportunity to cultivate their acquaintance. It was observed, however, that no birds still wore the knob on the bill, while the number of these appendages scattered about the island showed that many had been shed.

Our discovery of eight colonies or settlements of Pelicans on Anahao Island, where Ridgway found but one, indicates an increase in the Pelican population during a period when most of the larger birds of America have diminished in numbers. White Pelicans, which invariably vanish when man appears, have evidently, therefore, found a congenial retreat on Pyramid Lake, and in view of the remoteness and aridity of the region, one might imagine that they will long continue to exist there without molestation. But, alas! civilization in a form most fatal to certain species of birds, is undermining their stronghold.

Aside from local drainage, the Truckee River is the sole water supply of Pyramid Lake and its sister, Winnemucca Lake. A Government Reclamation Service Project, already well advanced, taps the Truckee on its way from Lake Tahoe down the eastern slope of the Sierras, in order to irrigate the Carson Valley. So much water will be taken that only enough will be left to supply one of the two lakes the Truckee feeds. Winnemucca is the fortunate one while beautiful Pyramid Lake is doomed to slow death by evaporation. As increasing alkalinity kills the delicious trout which now abound in it, the Pelicans will be robbed of their food. For a time they may fish in Winnemucca, but eventually the shoaling waters will connect their island with the mainland, and when the requisite insular protection disappears, the Pelicans must seek another island home.

Sadly enough, the same fate awaits the Pelicans which three years later (June 30-July 7, 1907), I visited on Lower

Klamath Lake, in southeastern Oregon, on the California line. Here their island homes are made by matted rafts of of tulé reeds, often acres in extent. The eggs are laid on the thick beds of fallen reeds with little or no attempt at nest-building. The immediate surroundings differ radically from those which prevail on Anahao Island, but the prime essentials of insulation and fish being present, other details are of minor importance.

The Government Reclamation Service has condemned this lake, not because its waters are required, but because they are useless or, from a strictly utilitarian view, worse than useless. When the project, now being developed, is completed, they will have disappeared down the Klamath River and 260,000 acres of tillable land will have taken their place. The reed islands will strand in the mud, the tulés will wither and alfalfa flourish in their place, the birds, like other indigenes, will find that the Government Land Office does not recognize a claim to ownership based only on priority of occupation, and, with their relatives of Pyramid Lake, they must search for a new country. Doubtless for a time, the peculiar conditions they require, will be available, but later they will surely be forced to migrate again, and eventually they will doubtless have to pay the penalty of all forms of life which cannot exist in contact with man.

The passing of so distinguished a bird occasions a regret only slightly tempered by the knowledge that the haunts from which they have been driven will, in due season, become the home of those smaller, more adaptable species to which civilization means an increasing abundance of food and a decreasing number of enemies.

Fifteen different groups of Pelicans, each containing from a score to several hundred birds, were found nesting on the rush islands of Klamath Lake. The tulés growing about the borders of the matted open spaces they occupied, afforded concealment for my blind and from it I finally saw something of the Pelicans' home-life at comparatively short

range. Although my blind had been placed in position the day before, and was visible only as a denser growth in the tulés, it was sometime after I entered it before the birds ventured to return to their down covered young, huddled in the reed beds. Some came by air, alighting with a resounding *fluff-fluff* of their eight-feet of wing-spread; others, like

"Alert with head erect"

stately ships, sailed into port at a regularly frequented landing place, but all came with much caution. My slightest movement, although unseen, appeared to alarm them; they seemed to feel my presence. The faint click of the camera shutter, sixty feet distant, placed them on the alert with head erect, and this pose was sufficient to induce birds about to land to turn quickly about and swim back into the lake.

Finally, they became more at ease and in response to the whining grunts of their offspring, opened their great bills, down which the young at once plunged their heads and necks in search of the fish at the bottom of the parental pouch, where the young birds would prod vigorously about for more than a minute, the parent submitting patiently. I never saw but one fed at a time (the Brown Pelican may

feed three!) and on emerging, the young bird showed none of the signs of exhaustion which follow the young Brown Pelican's similar efforts at fish-getting. In the confusion occasioned by my coming, the young Pelicans had deserted their nests or home-sites, and become to my eyes, hopelessly mixed in one compact wriggling mass; but the parent birds evidently had no difficulty in recognizing the members of their own family, and established their claims without those evidences of excitement and petty quarreling so characteristic of the more nervous Gulls and Terns nearby. Their only note was a deep-voiced, not loud, murmuring groan.

The adult birds had all lost the bill-knobs and white nuchal crest of the nuptial season, and the latter was replaced by the singular black or grayish patch which is not acquired until the breeding season is well advanced and is lost as soon as it is over.

It is unnecessary to set down here all the details of the studies made on this occasion, but one exhibition of wing-power which these unusually stolid birds gave me should not be omitted. Pelicans mount in broad spirals to the upper air not only to escape from danger below, but evidently for the exhilaration of the exercise; generally, therefore, numbers could be seen sailing serenely about, far over head. On the afternoon in question a thunder storm developed rapidly, the sky became ominously black and threatening, and a strong wind whipped the tulés into a rustling, troubled sea of green. This atmospheric disturbance acted upon the soaring birds in a remarkable manner, stimulating them to perform aërial feats of which I had no idea they were capable. They dived from the heavens like winged meteors, the roar of the air through their stiff pinions sounding as though they had torn great rents in the sky. Approaching the earth they checked their descent by an upshoot and then with amazing agility zig-zagged over the marsh, darting here and there like Swallows after insects.

Pelican Feeding Young
Note the knob on the bill of the bird in the background to the left

Having now secured the requisite data, specimens and photographs on which to base a group of White Pelicans, I abandoned their pursuit. The following season, however, brought me an exceptional opportunity to resume my study of these shy birds.

Pelican Scratching its Neck

In southern Saskatchewan, whither I had gone for Wild Geese and Grebes, I learned that the White Pelicans which pass through the region to more northern existing resorts, had this year remained to nest in large numbers. An unusually late spring and an abnormal supply of fish supplied by damming a stream which flowed into the lake, were evidently the incentives which had induced the birds to remain south of their regular nesting limit.

At least 3000 birds settled on a small mud-bar in Big Stick Lake. A few pairs of Pelicans had been known to nest here before, but there was no record of such a snowy gathering as made the bar conspicuously white at a distance of

"With great flapping they all took wing"

two miles. Few pebbles and no reed-beds were available for nesting material and most of the birds used weed-stalks, some building a not discreditable nest, while a few found pebbles, and others used merely a depression in the ground. The nearby mainland offered far better nesting facilities, but it is worthy of note that although uninspired by love of home, not one bird failed to respond to its island-haunting instincts.

On June 10, 1907, I drove out to this island, a method of transportation infinitely preferable to those employed on Shoal and Pyramid Lakes, though a mud-hole into which horses and wagon threatened to disappear, seemed to reveal a far better reason for the lake's name than the big stick of timber on which it is based. The young birds were just appearing. Knowing that exposure to the sun at this tender featherless stage is fatal, I retired from the island at once, leaving behind a dummy blind. At this stage of the nesting season, a bird's parental instinct reaches its highest development and even the undemonstrative Pelicans left their nests with reluctance. Subsequently, however, I came to the conclusion that their comparative tameness could possibly be attributed to the fact that the region in which they were accustomed to nest, was so remote from man that, having never been disturbed at this season, they had not learned to fear him.

Returning June 26, I found the young sufficiently well clad with down not to require the shelter of the parental breast. The dummy blind was replaced by the actual one, my assistant departed and I was left to enjoy a vividly interesting and exciting experience. The parent birds settled on the lake and swam in stately silence about the islet. Slowly they came nearer, and with great caution made landings here and there, advancing from all sides toward the nests which surrounded me. At a fancied cause of alarm, with great flapping they all took wing and in due time the whole proceeding was repeated. But finally they

ventured to within twenty feet of me. As they became more confident, the low, deep murmur of their voices increased in volume, and seemed singularly conversational.

The struggling mass of young birds which had retreated from me was slowly disentangled. Some were pulled at with the bill, some were fed, and gradually peace and order were restored; but at all times the blind was as closely watched as a suspicious character. At last my opportunity had come, and with note-book and camera, I worked as effectively as the fascination of my position permitted, observing definitely many things half seen before and others before unknown, and securing a series of unique pictures recording a phase of bird-life which the ornithologists of a succeeding generation will doubtless examine with the interest that we would give to photographs of a Great Auk colony.

Walking Past the Blind

Only Government intervention will save the great bird settlements of this plains region. The emigrants who are pouring into it, confronted by primitive conditions, meet the demands of the moment without thought of the future. A

ranchman whom I met, thought that when the young birds were large enough, the Pelican inhabited island would be an excellent place in which to fatten his hogs!

It is, therefore, greatly to be hoped that the Canadian Government will, without delay, set aside as bird reservations, at least those islands which it still possesses, having an area of a quarter section or less. The amount of land thus preserved would, in the aggregate, be small, but when we recall the numbers of birds which nest only on islands, it is obvious that the benefits to be derived from such an act would be incalculable.

Young Brown Pelican
Yawning

PART VIII.

IMPRESSIONS OF ENGLISH BIRD-LIFE

Selborne from the Hanger

IMPRESSIONS OF ENGLISH BIRD-LIFE

Next to our native birds, there are probably none of more general interest to the average American nature-lover than the birds of England. Personally, I confess that my desire to see and hear the Nightingale, Skylark, Blackbird, Redbreast, and other characteristic English species, in their haunts, has been more intense than that which has led me to the distant homes of tropical birds. I say "in their haunts," with emphasis, for I have at times with difficulty avoided hearing these birds in cages; an unfortunate enough experience in itself, and one which, having long in mind a pilgrimage to their home, would have deprived a first impression of half its force.

This longing to meet English birds at home is in part due to the fact that they live in England, in part to the place they occupy in English literature, and in part to a desire to compare them with our own birds.

A meeting with the same birds in France or Germany would not possess half the charm of an initial acquaintance in England. Nearly, if not all, that we know and have read of English birds, leads us to associate them with pastoral England, with copse and hedgerow, down and moor; with thatched roof and gray spire. For these attractive mental pictures, we have to thank Wordsworth, Shelley, Coleridge, Cowper, and other makers of English literature, to whose influence we must largely attribute the widespread interest in English birds, which, until recently, at least, have been better known by name to most Americans than have been our commonest native species.

So far as birds are concerned, however, the poets can only stimulate our desires without gratifying them, and the comparison of English birds with ours is obviously out of the question until one has seen and heard both. Even then

it cannot be fairly made by either an American or Englishman. This is not a matter of prejudice, but of experience. A bird's song is not to be judged as a musical composition. It is an expression of nature and its significance is to be measured by its associations.

No Englishman can read Lowell's

> "The Bobolink has come, and like the soul
> Of a sweet season vocal in a bird,
> Gurgles in ecstasy we know not what
> Save June! Dear June! now God be praised for June."

with the appreciation of the American who has grown up with the Bobolink. Nor can Wordsworth's lines,

> "O blithe new comer! I have heard,
> I hear thee and rejoice.
> O Cuckoo! Shall I call thee bird
> Or but a wandering voice?"

bring to the American that sense of returning spring which they doubtless convey to the Englishman.

The poets may, however, arouse the longing to see the scenes and hear the birds which have inspired them and it was with feelings of the keenest anticipation that I steamed up St. George's Channel with the unexpectedly mountainous coast of Ireland breaking the horizon to the west. A House Martin, which had boarded the steamer in latitude 48°, longitude 29°, when we were still nearly 1000 miles from land; and a pair of Wheatears and a Curlew which came aboard 140 miles from Fastnet Light, had given us a surprisingly early glimpse of British birds, and we were now convoyed by a fleet of hungry Gulls which had joined us in Queenstown harbor.

As we approached the coast of Wales, we encountered small companies of Murres and Puffins, which nest in certain small rocky islets or "stacks" off the neighboring shore. To the ornithologist, the presence of these boreal birds at this season, (May 25), was convincing evidence of

high latitude, and, at the same time, an admirable illustration of the faunally composite character of English bird-life; types we are accustomed to consider representative of northern and southern life-zones finding in England congenial surroundings.

"A Curlew which came aboard"

Scarce a week now remained of the Nightingale's song season, and a meeting with this most famous of feathered musicians was made the first object of my ornithological pilgrimage. The Nightingale is a bird of southern England, and without loss of time we passed through Liverpool into England, the England of the poets and birds, bound for London to meet correspondents with news of the most accessible, singing Nightingales.

Looking back over many thousands of miles of railway travel, I do not recall a more interesting journey than those four hours between Liverpool and London, which gave me my first views of English country and, incidentally, of many English birds. Pictures, which are generally of exceptional, rather than of typical scenes, and descriptions, I found

(and subsequent experience confirmed the opinion), had alike failed to convey a true impression of rural England.

I had been told, England was like a great park but I found it a farm, and a farm with a surprisingly large acreage in pasture land. The hedge rows, too, contained more large trees, and indeed the whole country was more wooded than I had expected to find it. But grass and grazing herds are assuredly more attractive than the best-kept cabbage or turnip fields, and trees are a glory anywhere. In short, therefore, I found the English country less groomed and just that much more attractive than I had anticipated.

Rooks, Starlings, Swallows, Swifts, Skylarks, Blackbirds, Thrushes, and Lapwing Plovers were the common birds seen from the train, the latter furnishing a brand new sensation in bird-life. The bird's size, form, and colors, its grace of carriage on the ground and dashing, erratic, aërial evolutions, give it high rank as an attractive part of any avifauna; while its abundance, in spite of the demand which places thousands of its eggs on the market annually, is inexplicable.

Reaching London, connections were at once established with the the correspondents who were to present me at the court of the Nightingale. Singing birds were reported from Surrey and also from Cambridge, and almost before I realized I was in England I found myself at nightfall in quiet Surrey by-ways listening for the

"Sweet bird that shunn'st the noise of folly,"

and in time the notes of not only one, but of three birds rang out in silvery clearness against the background of the night. They sang for hours. I heard them when they seemed within reach; and with almost equal distinctness, when I had gone to my hedge-enclosed home a quarter of a mile across the valley. They were said to be good singers, and I exulted in the completeness of this long-anticipated experience.

The Nightingale's song was, of course, unlike my precon-

ceived idea of it. I had expected a rushing outpouring of music, but I found a more deliberate song of disconnected phrases of from three to five seconds' length each, followed by pauses of almost equal duration.

> "The Nightingale, in transport, seemed to fling
> His warble out, and then sit listening."

Occasionally a more prolonged strain was given, but, as a whole, the song lacked the force, crescendo and diminuendo effects of a continuous effort. It is a surprisingly loud song, in tone a decided whistle; a wonderfully voluble, varied, but rather hard performance. At times, a measure or two suggested portions of the song of our nocturnal singer, the Chat, and again some of the more rapid calls reminded one of certain notes of the Carolina Wren, but as a whole we have no bird whose song resembles that of the Nightingale.

Two days later, at Cambridge, hearing a Nightingale singing in the afternoon, when its voice formed merely a part of the spring-time chorus, I was impressed alike with the part the bird's nocturnal habits have played in establishing its reputation as a songster and with the characteristic insight displayed in Shakespeare's lines:

> "The Nightingale, if she should sing by day
> When every Goose is cackling, would be thought
> No better a musician than the Wren."

At Cambridge, I was the guest of an English ornithologist whose home, with its surrounding acres on the Cam, afforded opportunities for making the acquaintance of English birds under exceptionally favorable conditions. Not only could I roam where I pleased, unquestioned, but the quiet, pastoral beauty of the meadows, hedge-rows, fens and winding river combined with perfect weather to make a flawless setting for my initial impressions of English bird-life.

Here, on May 27-29, beside the Nightingale, I met the Song and Missel Thrushes, Blackbird, Skylark, Rook, Jackdaw, Starling, Cuckoo, Chaffinch, Robin Redbreast, Linnet, Wood Pigeon, Turtle-Dove, Corn Crake, Moorhen—all

birds whose names are familiar to every English-speaking person—and other less-known species, thirty-six in all.

While the same amount of time, at a corresponding season, anywhere in the eastern United States would have yielded possibly from twenty to thirty species more, individually, the English birds would outnumber ours by at least two to one.

The Cam at Ditton Corner

Judged by the volume of its contribution to the chorus of bird music, the Song Thrush was at this time the most conspicuous bird. In general habits and economy, it may be compared to our Robin, which it appears to equal in numbers. Its song, however, is a finer performance than that of the American bird. It suggests that of the Brown Thrasher, but, while it possesses greater variety and brilliancy, it is without the deliberate rhythmic phrasing, and lacks the richness and volume which characterize the song of that bird.

Next to the Song Thrush, and in some places equalling it in numbers, was the Blackbird, a Thrush duplicating our Robin in size and form but with jet black plumage and a golden bill, and more trim and alert in appearance. To my ear the Blackbird is the most satisfying of English songsters. Its luscious, full-flavored, mellow fluting has, in a measure, the tender, spiritual quality so pronounced in the voices of our Thrushes, and which I found rare in the songs of English birds. There is, too, something naive, unformed, quaint and simple in the Blackbird's notes, which increases both the attractiveness of the song and of the songster.

The Missel Thrush, the third of the trio of common breeding Thrushes, was now feeding nearly fledged young and had ceased singing, an indication of how much earlier passerine birds nest in England than in our middle eastern states.

In spite of an effort not to use preconceived ideals as a standard for the actual thing, I could not conceal from myself a disappointment in the song of the Skylark. While one cannot but be impressed with the passionate energy which carries the bird hundreds of feet into the air, there to sing, without a moment's pause, for sometimes ten or twelve minutes, I felt that the bird would sing better if he did not sing so much. He sings both when exhaling and inhaling, and seems often to be out of breath. The result is a marvelous vocal feat surely, but the bird's brilliant twitterings and long-drawn reelings (I could think of no better word with which to describe a marked character of its song) did not appeal to me.

But one can readily imagine that the song of this exceedingly abundant and widely distributed bird might become

> "Better than all measures
> Of delightful sound,
> Better than all treasures
> That in books are found,"

and before leaving England I found myself listening to it with increasing pleasure.

The singular charm of the Cuckoo's simple, double-noted call, however, I at once acknowledged. Even when one hears it for the first time, it seems to voice the deeper joys of the life out-of-doors.

> "Each thing to its own depth was stirred,
> Leaf, flower, and heaven's moving cloud."

There is a certain quality in the bird's call which appeals to the ear much as the peacefulness of pastoral scenery affects the eye. The two-syllabled song of our own Bob-white, though quite unlike, and far cheerier than that of the Cuckoo, has this same power of expressing the purity and joyous serenity of a life near to nature. The Cuckoo, although it calls when flying, is far more often heard than seen, and I found, as a rule, that English birds were much shyer and more difficult to observe than ours, though I am wholly at a loss to account for this apparent difference. The Song Thrush and Redbreast were, however, exceptions.

As a familiar doorstep bird, one would expect the Redbreast to utter some homely little lay, resembling, for example, that of our Chipping Sparrow. But, on the contrary, its shrill, winding pipe and detached fragments of song seemed to me indicative of the wildness and restlessness which characterize some of the notes of the Purple Finch. The Redbreast sings throughout the greater part of the year and it is evident that one should hear its song during the comparatively silent winter season if one would understand the place it holds in English literature and in the hearts of the English people.

The House, or as we miscall it, the "English" Sparrow, claims with the Redbreast the privilege of doorstep bounty, but I noted with satisfaction that he is no more a favorite at home than he is in the country of his enforced adoption. The Englishman, however, does not regard the bird with the resentment of the American. It is a natural part of his avifauna and he is not responsible for its presence. We, on the other hand, might have avoided a feathered race-problem which each year becomes more serious: and it is this knowl-

edge of our short-sightedness that increases our irritation.

The abundance of this omnipresent pest does not atone for the comparatively limited number of fringilline birds in England. Where she has eighteen species of regular occurrence, we have, in a much smaller area in the east, over thirty. The decrease in numbers of the Bullfinch and Goldfinch, due to persistent trapping, leaves the Chaffinch as the best dressed, most musical bird among the common members of this family. One cannot wander far along an English hedgerow without hearing the clear, metallic *clink-clink* of this tastefully attired species. Its song is a bright if not highly melodious bit of bird-music; a series of rather beady, hurried, loud notes with a wren-like trill included between its slower opening and closing bars.

English Swallows are much like ours. Their *Hirundo rustica* is almost the counterpart of our Barn Swallow, their House Martin recalls our Tree Swallow, though the birds differ widely in nesting habits, while their Sand Martin is in fact our Bank Swallow, the only breeding British land bird absolutely identical with its American representative.

The English Swift, however, is a larger, and more striking bird than ours, its forked tail adding greatly to its appearance in the air; but its loud, squealing notes are no more musical than the chattering twitter of our bird.

England has no Icterine birds, no Orioles, Grackles, or Blackbirds, as we term them, but in place of the latter there is the Starling, one of the most abundant, if not *the* most abundant British bird. One sees it everywhere and as early as June, small flocks of young and old birds were observed, the nuclei of those enormous gatherings which have been pronounced "one of the finest sights that bird-life presents in England."

The descendants of Starlings introduced into Central Park, New York City, in 1890 now number thousands and in view of the bird's increasing abundance, I attempted to learn its economic status in England; but in default of pro-

longed study of its food habits at all seasons, no satisfactory, conclusive opinion of its relations to man can be formed.

The surprising abundance of Rooks, which were everywhere almost as numerous as are our Crows in southern New Jersey in winter, also raised the question of the position they held in regard to the agricultural industries of the country, but again in the absence of data, no definite answer could be obtained.

There can be no doubt of the importance of the place Starlings and Rooks occupy in an English landscape. Both are resident throughout the year and in the winter their conspicuousness is doubtless increased.

While the English Turtle-Dove may be compared to our Mourning Dove, we have nothing, in eastern North America, at least, to take the place of the splendid Wood Pigeon. To an American, the abundance, general distribution, and in places, tameness of so large and, doubtless, so edible a bird, is astonishing.

They were common wherever the country was at all wooded, and in some of the parks of London, and other cities, they were seen walking about on the lawns as much at home as were their dovecote relatives. It follows, then, that the loud, throaty *coo-er-coo, coo-coo* of this species and the purring notes of the Turtle-Dove were rarely wanting from any chorus of English bird song.

Even more surprising than the abundance of the Wood Pigeon was the number of Moorhens observed. The bird is almost a duplicate of our Florida Gallinule but I cannot conceive it possible for the latter species to exist in this country under conditions which the English bird finds favorable. Every reedy pond and puddle has one or more pairs, they are common in rivers when there is sufficient bordering vegetation to give concealment, and they nest regularly in one of London's most frequented parks.

While it is perhaps natural and desirable that the poets

should write of scenes and sounds which circumstances render most characteristic and conspicuous, the result, so far as birds are concerned, is the establishment of misleading standards and undeserved reputations. Thus, either because they were unknown or because they did not fit a theme, some of England's best songsters have been neglected by the poets.

There, for example, is the Reed Warbler, whose sustained, continued song possesses a variety and volume which makes it, to my mind, one of the most pleasing of English song-birds; or that charming bit of bird music, the easy, flowing, graceful, natural song of the Willow Warbler. The Tree Pipit, too, is an exceptionally good singer, while the wild, sweet, rapid, highly lyrical song of the Blackcap is a performance of unusual merit, suggesting the song of our Orchard Oriole.

But whether or not the visiting student of English bird-life is fortunate enough to have a friend at Cambridge or in some equally favorable locality, he should under no consideration fail to make a pilgrimage to Selborne. To my mind there is no place in England where the characteristic birds of the country can be seen and heard to better advantage.

Five miles from a railway and the nearest town, Selborne does not seem to have changed materially since the days of Gilbert White. Whether as the home of White or as a bit of rural England, Selborne more than satisfies one's preconceived ideals; although they are generally of so composite a nature, so wrought of numberless impressions that usually they are too far from the mark ever to be realized. But he who cannot find in Selborne's lanes and hedgerows, pastures and cultivated fields, beech-woods and gorse, thatched roofs and chimney pots, sturdy horses and plodding teamsters, village and manor life, material with which to construct every picture of English country-life he had ever imagined, should control his imagination and develop his constructive abilities.

Birds were abundant at Selborne, as indeed they were everywhere, but the large area and varied topography of public ground near the town, offers to the unintroduced tourist exceptionally favorable and attractive opportunities for observation.

But it is primarily because Selborne was the scene of Gilbert White's labors, that the nature lover should go there. The experience, too, will go far toward explaining the marvelous vitality of that little volume which has made its author and his home forever famous. He will find it no antiquated eighteenth century dissertation of purely bibliographic value, but a useful work of reference containing information for which he will search through other English nature books in vain. In short, Gilbert White wrote not only the first but the best book of its class. Need one seek better reasons for its longevity and perennial interest?

From Selborne, I went to Winchester for a glimpse of Isaac Walton's haunts in the valley of the Itchen. There is a delightful walk south of the city along a branch stream which will lead one to the Itchen itself, flowing peacefully through broad meadows with hedge-bordered downs arising in the distance. Disciples of the good Isaac were diligently casting the fly in waters which evidently still repay the fisherman's wooing; there was always one or more Skylarks overhead and below, Lapwings, Stone-chats, Wagtails, Meadow Pipits and Reed Buntings. Doubtless also there were Sedge and Reed Warblers, but I did not see them.

Winchester brings one within easy reach of the New Forest, one of the places which no naturalist visiting England should fail to see. From the time of William the Conqueror, the New Forest has been a royal preserve and it is to-day one of the few places in England where the tourist may find comparatively primæval conditions. Birds which have become rare or have been extirpated in other parts of southern England, may still be found in favorable places in this Government reservation.

I went to Holmesley and drove thence, through Burley, to Picket Post, lodging at an isolated tea-house in the midst of the gorse-covered moors,—the home of the Dartford Warbler. Nearby, was a bit of the original forest growth, which doubtless covered a large part of the country at the time of the Norman invasion. Here are magnificent patriarchal beeches, not one, but every tree of exceptional beauty and dignity. The mossy ground beneath, decorated with hy-

Beeches in the New Forest

acinth, wood sorrel, and veronica, was as free from undergrowth as a lawn, and stretched away beneath the gray limbs and green leaves, into enchanted glades and aisles, from which one would not have been surprised to see Robin Hood and his merry men step forth at any moment. Never have I seen a more inviting woodland.

One may drive north through the forest to Salisbury where, on the surrounding plains, he will not be out of hear-

ing of Skylarks throughout the long English day.

From Salisbury, I went to Oxford and thence to Stratford and Warwick, and in each place the bird student may pursue his investigations amid charming surroundings. Of the coincident historical and literary associations, it is unnecessary to speak.

At Oxford, Addison's Walk, in the grounds about Magdalene College, give the stranger access to most attractive and secluded retreats; while at Warwick he is permitted a near view of a castle which will show him Jackdaws, Rooks, Starlings, and Wood Doves in the setting where literature so frequently places them.

At Stratford, he may sit in the churchyard and see the Rooks at their nests overhead while the Moorhens disport themselves in rushes of the bordering Avon; and if he will cross the river and follow the north shore about half a mile, he will come to a fringe of woodland on a bank so steep, that the tops of trees growing from the shore below, will be on a level with his head. From the narrow, picturesque pathway, one therefore has the upper branches within reach of one hand, while with the other he may touch the lower growth, conditions which bring a rather unusual assemblage of birds within easy range.

Here, on a rainy morning (June 11), I saw in "one look," a Nightingale with food for her young, Bullfinch, Song Thrush, Willow Wren, Wren, White-throat, Hedge Sparrow, Chaffinch, Blue-tit, Long-tail Tit, Spotted Flycatcher, Blackcap, Blackbird, and Chiff-chaff. Swallows House and Bank Martins and Swifts were constantly dashing up and down over the river, and from near-by rolling fields came the song of the Skylark, a total of nineteen species seen or heard at virtually the same moment.

Under no circumstances should the bird-lover leave England without a visit to some point on the coast or near-by islets frequented by nesting Murres, Puffins and Razor-bills. Doubtless in no part of the world can he so easily reach the

Bird-egging on Bempton Cliffs

About 130,000 Murres' eggs are gathered here yearly. A "climmer" may be seen on the face of the cliff.

haunts of these boreal water-fowl. They may be found in favorable localities, from the Scilly Islands to the Hebrides, but a variety of circumstances led me to the Bempton Cliffs at Flamborough Head in Yorkshire, the Farne Islands, off the Northumberland coast, and Bass Rock, in the Firth of Forth, and I am assured that no ornithological pilgrim will go far from the Mecca of his hope if he follows this route.

At the Bempton Cliffs, which may be reached from Bridlington, one may see the men go down the precipitous chalk-headlands, from three to four hundred feet, on a rope, to gather Murres' eggs, while their mates, three to the gang, with heels dug into oft-used hollows, stolidly lower or raise,

in response to pulls on the signal line from the unseen "climmer" below. This is a long-established profession about which hang many quaint usages.

At Bempton, the tourist, unless he be possessed of sufficient nerve to "try the ropes," must content himself with a view of the birds from above, but at the Farnes, if the sea

The Pinnacles in the Farne Islands

The succeeding picture shows the Murres on the summit of the Pinnacles at the right.

permits, he may land on low islands populated with a myriad of sea-fowl, among whose homes he may walk at ease, while a very little caution will place him on speaking terms with Murres, Puffins, Arctic and Sandwich Terns, Kittiwakes, Lesser Black-backed Gulls, Cormorants, and, best of all, Eider Ducks.

The Farnes is the most southern British breeding station of this widely read of but little known bird and I count as perhaps the most memorable of my ornithological experiences in England the privilege of stroking a wild Eider, as she sat upon her eggs within their half-seen circlet of down. She turned and pecked my finger gently, almost caressingly, I thought.

Murres Nesting on the Summit of the Pinnacles
Photographed across the gap from the main island; see preceding picture.

Lesser Black-back Gulls

The Farnes will be recalled as the home of St. Cuthbert and the scene of Grace Darling's heroism and a connecting historical note is supplied by one of the bird wardens, Jack Darling, a nephew of the light-keeper's famous daughter.

Bass Rock, too, has its history as a prison for Dissenters and as the one Scottish stronghold not captured by the Cromwellians, but to the bird student it is known chiefly as the original home, in scientific nomenclature at any rate, of the Gannet or Solan Goose, which Linnæus named *Sula bassana*, under the impression that this splendid bird inhabited only the Bass. As a matter of fact, it is found in only about a dozen islets in Great Britain, and two in America.

Ten thousand Gannets, it is said, nest on the Bass to-day and so tame are they that the visitor who does not mind looking down 450 feet of sheer cliff, may readily climb

among them, selecting such groups for his camera as taste dictates. Not a bird will refuse him a sitting. It is a wild scene but would be far more impressive if it were not so easily reached. But the very accessibility which places the Rock (by way of North Berwick and Cantey Bay) within two hours of Edinburgh commends it to the hurried traveler. At the same time, one may visit the ruins of Tantallon

Puffins

Castle on the adjoining mainland and in this shattered but noble old stronghold of the Douglasses, find again the historical setting which adds so much to the charm of bird study in England; or, to speak more strictly, in Great Britain; for we have crossed the border line into Scotland and are now within an hour or two of a country differing markedly in topography and, to a lesser degree, in bird-life from anything we have seen to the southward.

I must resist, however, the temptation to tell of Red Grouse, Black Cock and Ptarmigan, Wheatears, Rock Thrushes and Golden Plover, but no bird-lover should resist the temptation to visit the haunts of these birds amid the lochs and heather-grown moors of the Highlands.

While my very limited experience does not warrant generalization in regard to the attractiveness and musical ability of English birds as compared with ours, there can be no question concerning their greater abundance. Everywhere I was impressed with the truth of this observation, and I cannot conclude this article without some attempt to inquire into the causes underlying this marked numerical difference.

A Sitting Eider *(Somateria molissima)*
Note the circlet of down about the nest

We have, as I have before remarked, a larger number of species, and in our northern states, birds are more rigidly protected than they are in England, where bird-nesting is universal and bird-trapping locally countenanced.

A variety of factors seem to have operated in producing the results now so noticeable to an American. The most fundamental and far-reaching in its influence appears to lie in the fact that English birds are less migratory, as a whole,

A "Watcher" stroking an Eider on Her Nest

Eider on Nest

than ours, and are, consequently, not exposed to the dangers which beset birds making extended journeys in part over large bodies of water. Furthermore, those that remain in England throughout the year have not to contend with the severe winters which so often bring disaster to our permanently resident birds.

Bass Rock from the Mainland
In the foreground a flock of Eiders; with a male on shore in breeding plumage

The importance of this suggestion is emphasized when it is expressed in figures. Thus, the list of birds of regular occurrence in Great Britain, numbers about 225, of which no less than 134 are, as species or individuals, permanently resident; while the list of birds recorded from within a radius of 50 miles of New York City, exclusive of "accidental" species, is 310, of which only 35 are permanently resident.

It is also of first importance to observe that the abundant British birds of to-day, the conspicuous successes in bird-life, are admirable illustrations of the rigid sifting effects of

conditions so severe that only the fittest survive. The list of birds which, as British, are extinct or nearly so, is a large one and includes the Spoonbill, Avocet, Bustard, Kite, Marsh Harrier, Osprey, Capercallie (re-introduced), Crane, Chough and other species.

Gannets on the Bass

In every instance these birds have succumbed to civilization in one or more of its aggressive forms, as it has destroyed forests, drained marshes, killed for sport or collected for alleged scientific purposes.

Other species, for example Hawks, Jays and Magpies, supposed to be harmful to game-birds or their eggs, have greatly decreased or disappeared before the constant persecution of the game keeper. I saw but four Hawks, three

Nesting Gannets

Jays and two Magpies while in England, and most of these were in the New Forest.

Still other species, like the Bullfinch and Goldfinch, have diminished through the excessive demonstration of that abortive love of birds which condemns them to captivity and, usually, early death.

On the other hand, many of the acts which have brought destruction to the species mentioned have created an exceptionally favorable environment for birds like the House Sparrow, Starling, Song Thrush, Blackbird, and Skylark, which, through man's agency, find some of their natural enemies removed, their supply of food increased, and their available breeding area widened.

In America, virtually all our most abundant, widely distributed species, winter in the United States and hence are not exposed to those destructive agencies which beset birds migrating over seas. However, leaving out of consideration

this cause of high mortality and that occasioned by winter storms, environmental conditions in America are too unsettled or at best are too recently settled for us to have witnessed that essentially final adjustment between the bird and the sum total of its surroundings, such as we observe in England.

Our Robin, or Migratory Thrush, as our English cousins call it, appears, however, to have established satisfactory relations with the world as it finds it and is as preëminently a success in bird-life as its English representative, the Song Thrush.

Let us hope that with other species, also, we may be able so to control the selective and determining processes which are now shaping the America of succeeding generations, that those who come after us will lose no part of their rich heritage in bird-life.

Young Flamingo

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